



**TXC CORPORATION**

Serial No. :

Issue Date

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www.txccorp.com

# SPECIFICATION

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

PRODUCT TYPE : SMD GLASS SEALING XTAL 3.2 × 2.5

NOMINAL FREQ. : 24.576000MHz

TXC P/N : 7V24580012

REVISION : A1

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

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.

PE/RD	QA	MFG
<i>Robin Huang</i>	<i>Samson Xiong</i>	<i>Jake Liu</i>
Robin Huang	Samson Xiong	Jake Liu

**RoHS Compliant**





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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±5°C

Relative humidity : 40%~70%

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

Ambient temperature : 25±3°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:

0.018±0.001 g/pcs

	Parameters	SYM.	Electrical Spec.				Notes
			MIN	TYP	MAX	UNITS	
1	Nominal Frequency	FL	24.576000			MHz	-
2	Oscillation Mode	-	Fundamental			-	-
3	Load Capacitance	CL	9			pF	-
4	Frequency Tolerance	-	±15			ppm	at 25 ± 3 °C
5	Frequency Stability	-	±20			ppm	Over Operating Temp. Range (Reference 25°C)
6	Operating Temperature	-	-20	~	85	°C	-
7	Aging	-	-15	~	5	ppm	10Years
8	Drive Level	DL	-	100	300	uW	-
9	Equivalent Resistance Rr	Rr	-	-	50	Ω	-
10	Shunt Capacitance C0	C0	-	-	3	pF	-
11	Insulation Resistance	-	500	-	-	MΩ	at DC 100V
12	Storage Temperature Range	-	-40	~	85	°C	-

## ■ FACTORY LOCATION

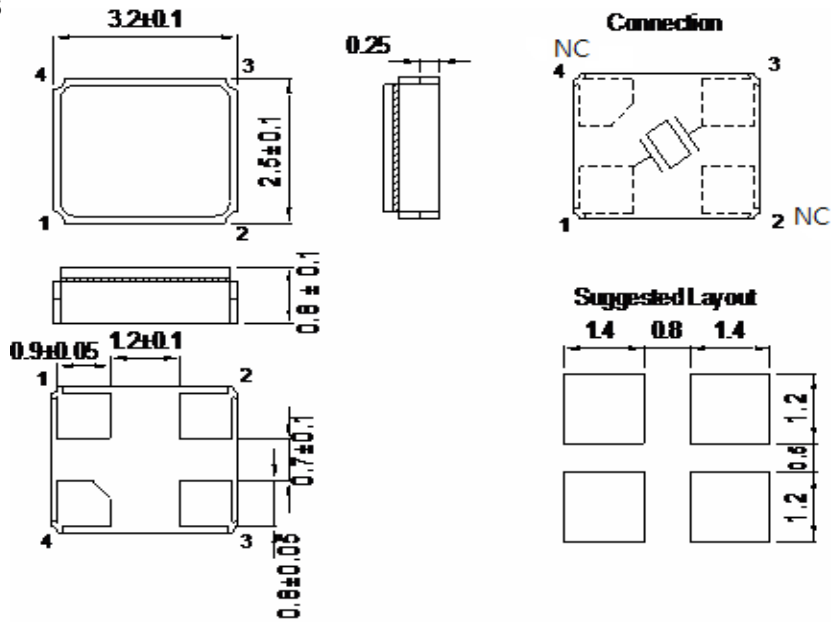
TXC (NINGBO) CORPORATION

NO.189 Huang Shan West Road, Beilun District,

Ningbo Zhejiang China

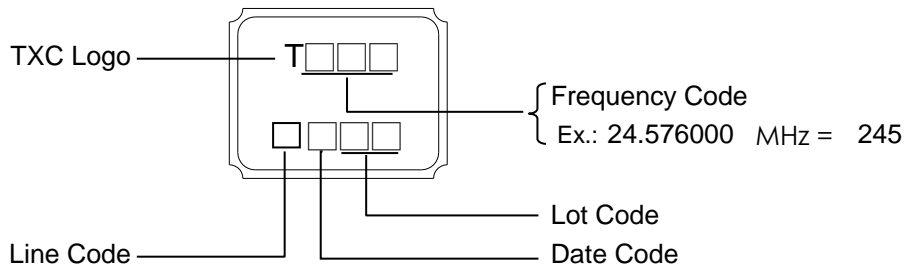
**■ DIMENSIONS**

(Unit:mm)



\*Coplanarity of solderable areas Camber 0.10 mm Max

**■ MARKING**



**Date Code:**

YEAR \ MONTH				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

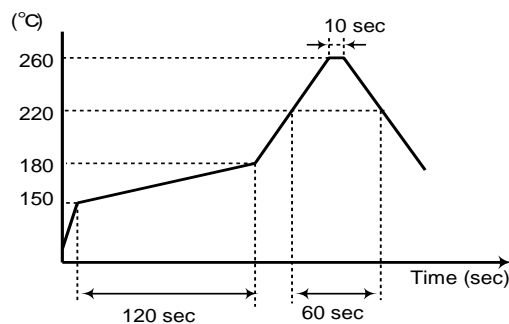
\*This date code will be cycled every four years

**■ SUGGESTED REFLOW PROFILE**

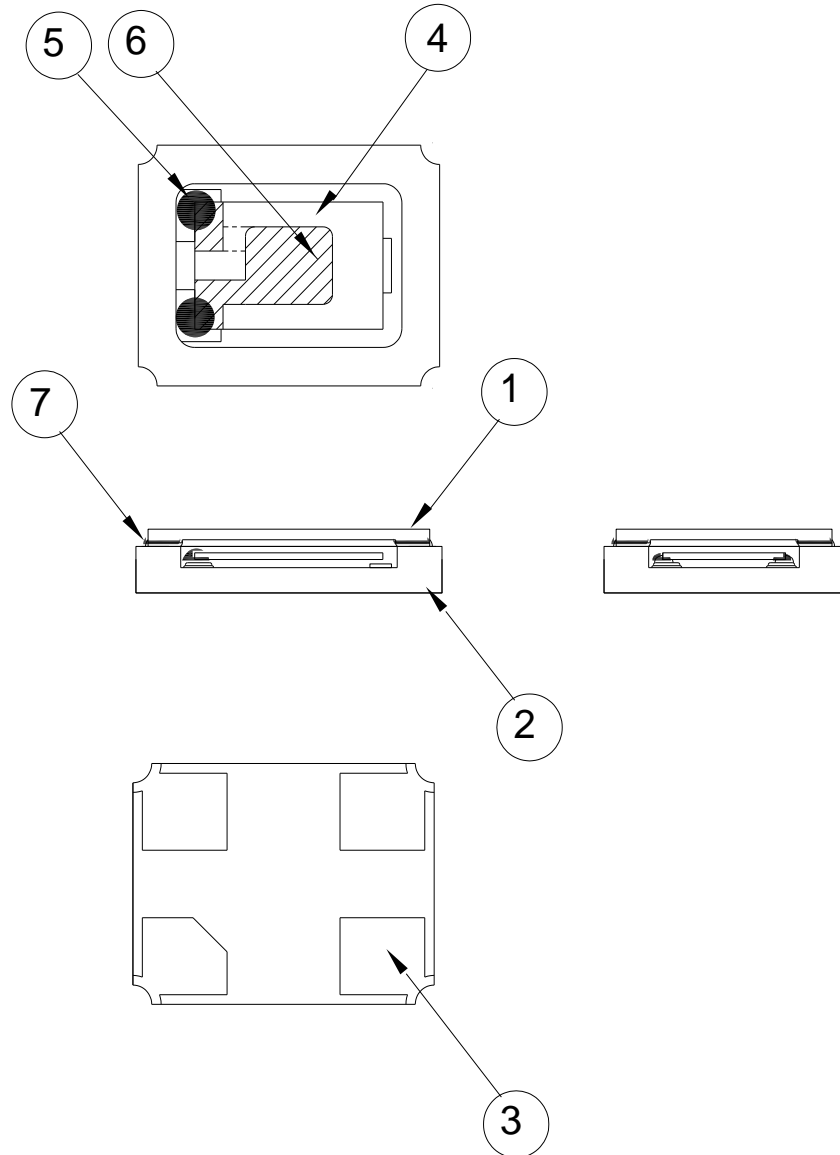
Solder melting point :  $220 \pm 10$  °C, 60 sec. Min.  
 Peak Temperature:  $260 \pm 5$  °C, 10 sec. Max.

**■ SUGGESTED MANUAL SOLDER CONDITION**

Temperature:  $350 \pm 10$  °C  
 Time: 3 sec.  
 Re-solder times: twice

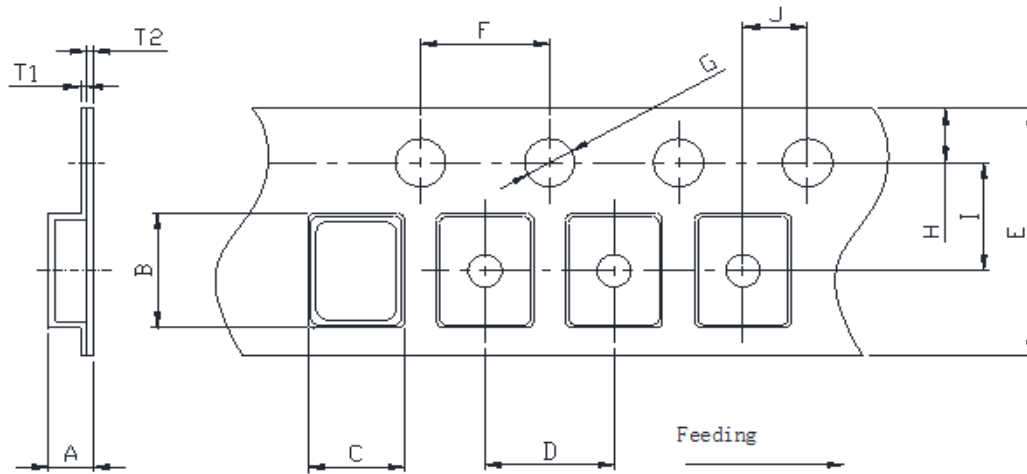


■ **STRUCTURE ILLUSTRATION**



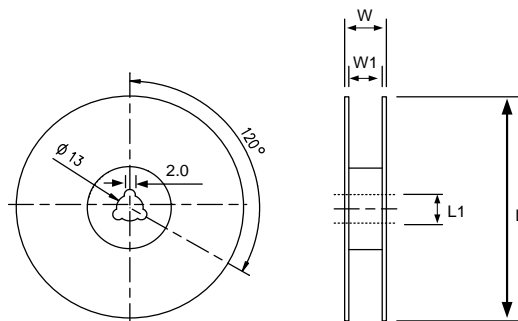
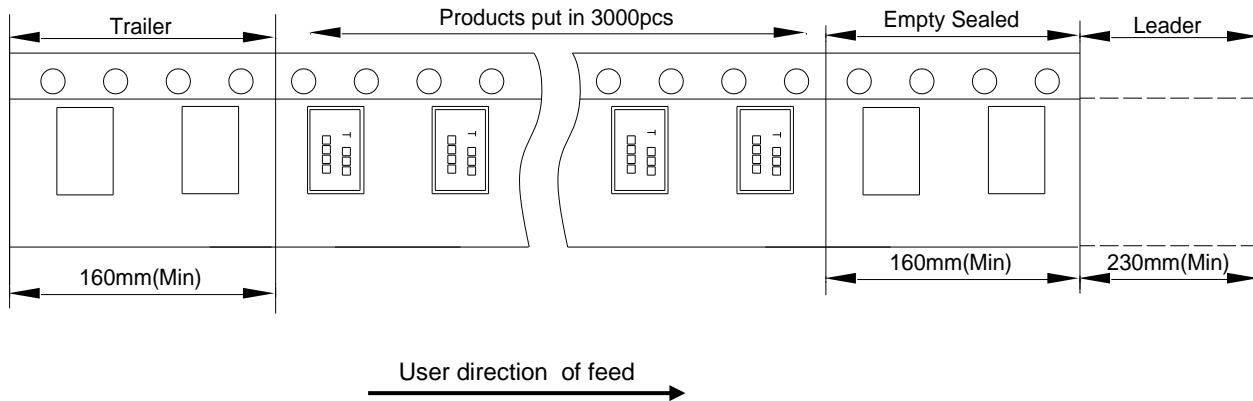
NO	COMPONENTS	MATERIALS	FINISH/SPECIFICATIONS
1	Cap	Ceramic (Al <sub>2</sub> O <sub>3</sub> )	-
2	Package	Ceramic (Al <sub>2</sub> O <sub>3</sub> )	-
3	PAD	Au	Tungsten metalize + Ni plating + Au plating
4	Crystal blank	SiO <sub>2</sub>	-
5	Conductive adhesive	Resin+Ag	-
6	Electrode	Ag+Cr	-
7	Sealing Glass	Glass(PbO)	-

■ EMBOSS CARRIER TAPE & REEL



DIMENSIONS	A	B	C	D	E	F	G	H	I	J	T1	T2	
	1.65±0.10	3.40±0.10	2.70±0.10	4.00±0.10	8.00±0.20	4.00±0.10	1.55±0.10	1.75±0.10	3.50±0.10	2.00±0.10	0.25±0.05	0.06±0.02	(UNIT : mm)

REMARK :



DIMENSIONS	L	L1	W	W1	
	178±1.00	13±0.50	11.5±0.20	8±0.10	(UNIT : mm)

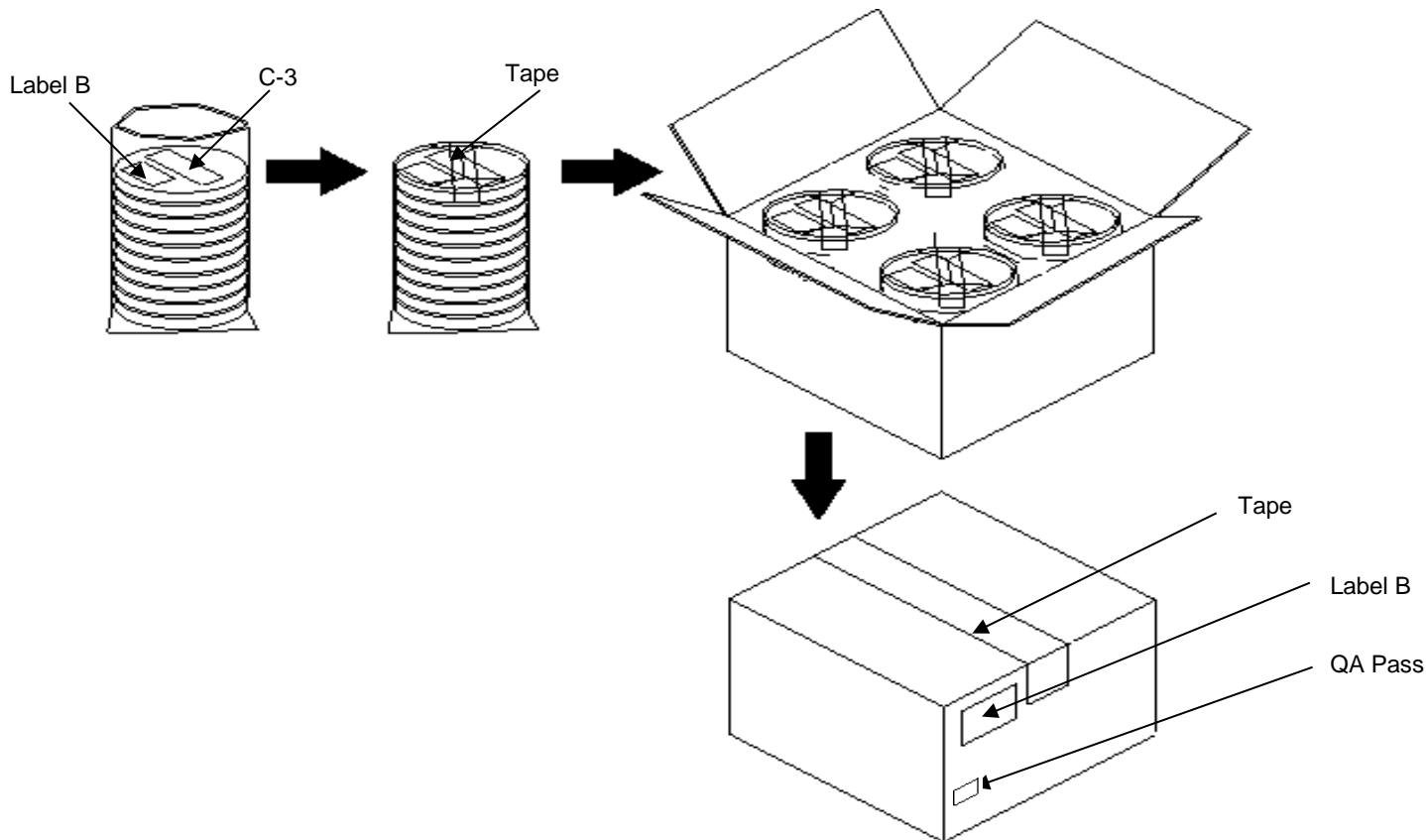
**PACKING**

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:

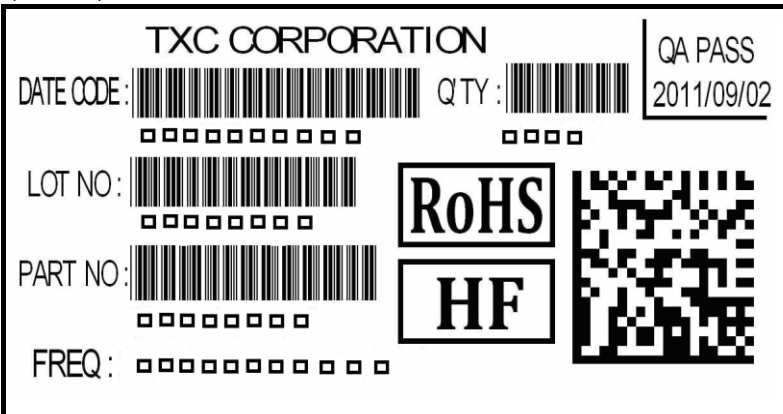
- 1. L200 X W200 X H140mm
- 2. L200 X W200 X H250mm
- 3. L400 X W200 X H250mm
- 4. L400 X W400 X H280mm



(Label C-3) Size:75 X 50mm



(Label B) Size:80 X 40mm



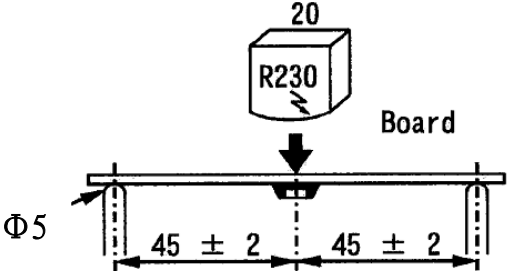
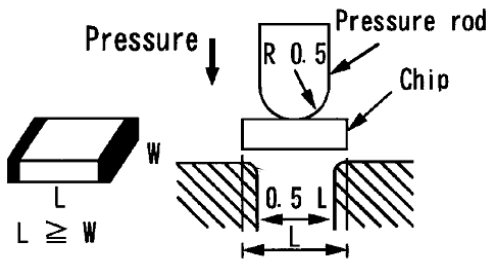
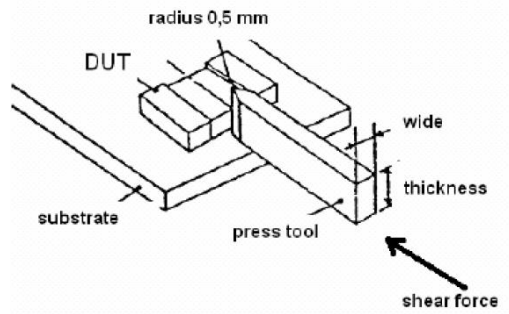
**[STORAGE]**

- 1. The storage time to be 1 year maximum.
- 2. Don't be caught in the rain.
- 3. The storage environment shall be 5°C ~40°C temperature and 30% ~ 75%RH humidity and free from the sun shine.
- 4. If customers have special requirements, we can paste labels according to it.



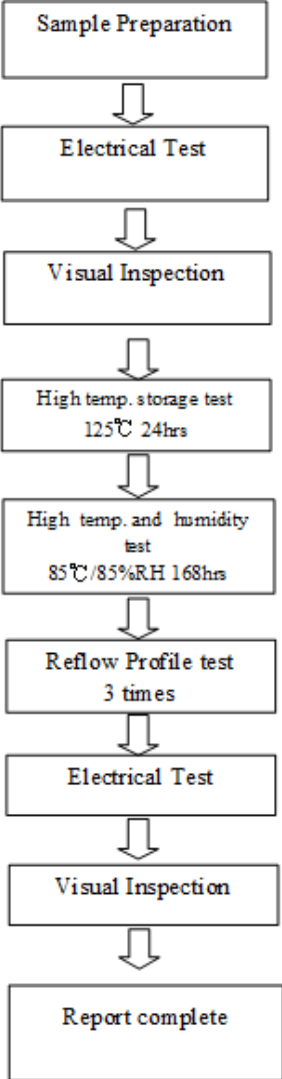
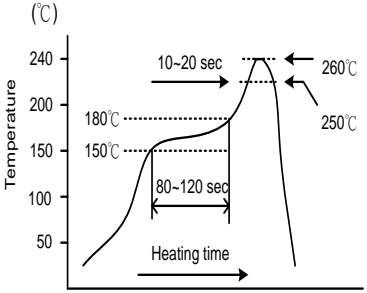
■ **RELIABILITY SPECIFICATIONS**

■ Endurance characteristics

	Items	Conditions	Specifications
1	Substrate bending test (Bond strength of the end face plating)	<p>Apply pressure in the direction of the arrow at a rate of about 0.5 mm/s until bent width reaches 3 mm and hold for 5 s.</p> <p>Refer to Sub-clause 6.1 "Electrode strength (Bending strength)", STM-1150 "Surface Mount Devices-Parts Design Standard."</p> 	<p>1. Frequency change: Within ±10ppm and in customer's specification.</p> <p>2. Equivalent series resistance (E.S.R) change: Within ±15% or 5Ω (larger value) and in customer's specification.</p>
2	Core body strength	<p>A static load of 10 N using a R 0.5 scratch tool shall be applied on the core of the component and in the direction of the arrow and held for 10 s.</p> <p>Refer to Sub-clause 6.3 "Part body strength", STM-1150 "Surface Mount Devices-Parts Design Standard."</p> 	<p>1. Frequency change: Within ±10ppm and in customer's specification.</p> <p>2. Equivalent series resistance (E.S.R) change: Within ±15% or 5Ω (larger value) and in customer's specification.</p>
3	Adhesion (Electrode peeling strength)	<p>Applied Force: 1.8 kg, Duration Time: 60 ± 1 Sec</p> <p>Refer to AEC_Q200 METHOD - 006</p> 	<p>1. Frequency change: Within ±10ppm and in customer's specification.</p> <p>2. Equivalent series resistance (E.S.R) change: Within ±15% or 5Ω (larger value) and in customer's specification.</p>

■ **RELIABILITY SPECIFICATIONS**

■ Endurance characteristics

	Items	Conditions	Specifications
1	Solderability	Pb free:245°C±5°C , 5 Sec. ( 125°C , 120Sec. PREHEATED) Refer to STM-1254-02 "Test Methods for electronic Components, Lead-Free Soldering arts Design Standard Part 2: Solderability Test for SMDs, Lead-Free Soldering."	Check by Magnification 50 X Minimum 95% of immersed terminal shall be covered with new uniform solder.
2	Self alignment effect	Pre-heating 130~170°C/40~90s, Heat 225°C or more,20~30sec, Peak 230±2°C,on PC Board  This item is applied when the 3-3-11 clause cannot be examined. Refer to STM-1254-03 "Test Methods for Electronic Components, Lead-Free Soldering Parts Design Standards Part 3: Mounting Quality Test for SMDs Lead-Free Soldering."	Self alignment effect shall exist, and the electrode shall return inside land.
3	(SMD) Resistance to soldering heat	Refer MSL report  	1. Appearance inspection 2.Frequency change: Within ±10ppm and in customer's specification. 3.Equivalent series resistance(E.S.R) change: Within ±15% or 5Ω(larger value)and in customer's specification.

■ **RELIABILITY SPECIFICATIONS**

■ Endurance characteristics

	Items	Conditions	Specifications
4	Sealing	He bombing 4.5kg/cm <sup>3</sup> for 2 hours Standard sample for automatic gross leak detector, test pressure: 2kg/cm <sup>3</sup>	<1 × 10 <sup>-9</sup> Pa.m <sup>3</sup> /sec <1.5 × 10 <sup>-5</sup> Pa.m <sup>3</sup> /sec
5	Electrical resistance to solvents	Refer to Sub-clause 7.6 "Solvent resistance(ultrasonic cleaning and immersion cleaning)", STM-1150 "Surface Mount Devices-Parts Design Standards." <u>Ultrasonic cleaning</u> Cleaning agent shall be Isopropyl Alcohol. Condition shall be 20mW/cm <sup>3</sup> , 28kHz, 60 sec (at room tempe.) <u>Immersion cleaning</u> The specimen shall be cleansed at normal temperature for 90s using isopropyl alcohol.	1.Frequency change: Within ±10ppm and in customer's specification. 2.Equivalent series resistance(E.S.R) change: Within ±15% or 5Ω(larger value)and in customer's specification. 3.Appearance without distinct damage.
6	Resistance to Dissolution of Metallization	Refer to STM-1254-09 "Test Method for Electronic Components, Lead-Free Soldering Parts Design Standards Part 9: Resistance to Dissolution of Metallization Test for SMD's Lead-Free Soldering."	Base material of electrodes shall not be exposed.
7	Salt mist	The quartz crystal oscillator shall be subjected continuously to a fine mist of salt solution at temperature of 35±2°C for 48h(salt solution concentration:5±1% by weight.) After removing the salt deposits by water,it shall be subjected to standard atmospheric conditons for 1h.Then the appearance of the quartz crystal oscillator shall be checked. for other procedures,reter to IEC 60068-2-11. others JIS C 60068-2-11	1.Frequency change: Within ±10ppm and in customer's specification. 2.Equivalent series resistance(E.S.R) change: Within ±15% or 5Ω(larger value)and in customer's specification. 3.Appearance without distinct damage.
8	Soldering Joint Life Test	Refer to STM-1254-07 "Test Method for Electonic Components. Lead-Free Soldering Parts Design Standards Part 7: Solder Joint Endurance Test for SMD's, Lead-Free Soldering." 1000cycles of thermal shock -40/85°C for 30min .Interim judgment of cross section at the 500cycles is acceptable ,solder joints should have electric continuity after 1000cycles	Solder joints should not be disconnected at 1000cycles.however,with due consideration of long hours of testing 500 cycle of life prediction is acceptable.in that case,criteria is included below(recommend SEM judgment)

**RELIABILITY SPECIFICATIONS**

**Endurance characteristics**

Items	Conditions	Specifications															
9 Vibration	<p>Endurance conditioning by a frequency sweep shall be made. The entire frequency range, from 10Hz to 55Hz and return to 10Hz shall be transversed in 1 min. Amplitude (total excursion):1.5mm This motion shall be applied for a period of 2h in each of 3 mutually perpendicular axis (a total of 6h.) for other procedures, refer to IEC 60068-2-6 others JIS C 60068-2-6</p>	<p>1.Frequency change: Within <math>\pm 5</math>ppm and in customer's specification. 2.Equivalent series resistance(E.S.R) change: Within <math>\pm 15\%</math> or <math>5\Omega</math>(larger value)and in customer's specification. 3.Appearance without distinct damage.</p>															
10 Shock	<p>Peak acceleration:981m/s<sup>2</sup> Duration of the pulse:6ms Three successive shocks shall be applied in both direction of 3 mutually perpendicular axis (a total of 18 shocks.) For other procedures, refer to IEC 60068-2-27 others JIS C 60068-2-27</p>	<p>1.Frequency change: Within <math>\pm 10</math>ppm and in customer's specification. 2.Equivalent series resistance(E.S.R) change: Within <math>\pm 15\%</math> or <math>5\Omega</math>(larger value)and in customer's specification. 3.Appearance without distinct damage.</p>															
11 Cold	<p>The quartz crystal oscillator shall be stored at a temperature of <math>-40\pm 3^{\circ}\text{C}</math> for 2h. Then it shall be subjected to standard atmospheric For other procedures, refer to IEC 600068-2-1 Others JIS C 60068-2-1</p>	<p>1.Frequency change: Within <math>\pm 10</math>ppm and in customer's specification. 2.Equivalent series resistance(E.S.R) change: Within <math>\pm 15\%</math> or <math>5\Omega</math>(larger value)and in customer's specification.</p>															
12 Dry heat	<p>The quartz crystal oscillator shall be stored at a temperature of <math>85\pm 2^{\circ}\text{C}</math> for 2h. Then it shall be subjected to standard atmospheric For other procedures, refer to IEC 600068-2-2 Others JIS C 60068-2-2</p>	<p>1.Frequency change: Within <math>\pm 10</math>ppm and in customer's specification. 2.Equivalent series resistance(E.S.R) change: Within <math>\pm 15\%</math> or <math>5\Omega</math>(larger value)and in customer's specification.</p>															
13 Damp heat (steady state)	<p>The quartz crystal oscillator shall be stored at a temperature of <math>40\pm 2^{\circ}\text{C}</math> with relative humidity of 90% to 95% for 48 h. Then it shall be subjected to standard atmospheric condition for 1h, after which measurement shall be made. For other procedures, refer to IEC 60068-2-78. others JIS C 60068-2-78</p>	<p>1.Frequency change: Within <math>\pm 10</math>ppm and in customer's specification. 2.Equivalent series resistance(E.S.R) change: Within <math>\pm 15\%</math> or <math>5\Omega</math>(larger value)and in customer's specification.</p>															
14 Temperature cycling	<p><math>-40^{\circ}\text{C}</math> to <math>125^{\circ}\text{C}</math>, 15min dwell time at each temperature extreme. 1 min. maximum transition time. 300cycles. measurement taken after 1 hours</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Temperature</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>-40\pm 3^{\circ}\text{C}</math></td> <td>15 minutes</td> </tr> <tr> <td>2</td> <td><math>25^{\circ}\text{C}</math></td> <td>Within 1 minute</td> </tr> <tr> <td>3</td> <td><math>125\pm 2^{\circ}\text{C}</math></td> <td>15 minutes</td> </tr> <tr> <td>4</td> <td><math>25^{\circ}\text{C}</math></td> <td>Within 1 minute</td> </tr> </tbody> </table> <p>For other procedures, refer to IEC 600068-2-14</p>		Temperature	Duration	1	$-40\pm 3^{\circ}\text{C}$	15 minutes	2	$25^{\circ}\text{C}$	Within 1 minute	3	$125\pm 2^{\circ}\text{C}$	15 minutes	4	$25^{\circ}\text{C}$	Within 1 minute	<p>1.Frequency change: Within <math>\pm 10</math>ppm and in customer's specification. 2.Equivalent series resistance(E.S.R) change: Within <math>\pm 15\%</math> or <math>5\Omega</math>(larger value)and in customer's specification.</p>
	Temperature	Duration															
1	$-40\pm 3^{\circ}\text{C}$	15 minutes															
2	$25^{\circ}\text{C}$	Within 1 minute															
3	$125\pm 2^{\circ}\text{C}$	15 minutes															
4	$25^{\circ}\text{C}$	Within 1 minute															

## **Non-use Warranty for the Substances Regulated by SONY SS-00259**

**We hereby certify that :**

- 1. This part should not contain any substances which are specified in "SS-00259-01"**
  
- 2. Clarify by delivery specifications about the existence of use of the substance which are specified in "SS-00259-01"**
  
- 3. In order to make sorting of plastic waste easy, material symbols is marked on the plastic part.  
For details on marking symbols, refer to "STM-1195-01".  
Marking may be omitted in the following cases:  
.Not enough space to apply the marking  
.Marking would interfere with performance or functional requirements  
.Marking technically not feasible due to the specific production method**
  
- 4. Purchase recycled resins and wire rods only from the business partners that Sony approves as Green Partners.**

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