

1. QUARTZ CRYSTAL UNIT SPECIFICATION

1.1 Nominal Frequency :	12.00000MHz
1.2 Holder type :	FTX321S (SMD3225 Seam Type)
1.3 Mode of oscillation :	Fundamental
1.4 Frequency tolerance (ΔFL) :	$\pm 10\text{ppm}$ at $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$
1.5 Equivalent resistance (RR) :	30ohms max
1.6 Operating temperature range (T_{OPR}) :	-40°C To $+85^{\circ}\text{C}$
1.7 Storage temperature range (T_{STG}) :	-55°C To $+125^{\circ}\text{C}$
1.8 Frequency Stability :	$\pm 30\text{ppm}$ at -40°C To $+85^{\circ}\text{C}$
1.9 Loading capacitance (CL) :	20pF
1.10 Drive level (D_L) :	100 μW Typical (200 μW max)
1.11 Shunt Capacitance (C_0) :	5.0pF max
1.12 Insulation resistance (IR) :	More than 500M Ω at DC 100V
1.13 Circuit :	Measured in HP/E5100A,S&A 250B
1.14 Aging :	$\pm 3\text{ ppm Max}$ ($+25^{\circ}\text{C}$ 1 st Year)
1.15 Dimensions and marking :	Refer to page.3
1.16 Emboss carrier tape & reel :	Refer to page.5 and page.6
1.17 Note :	

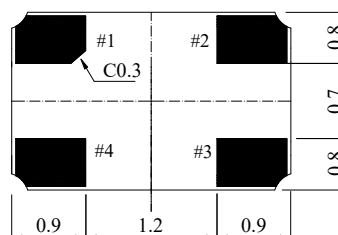
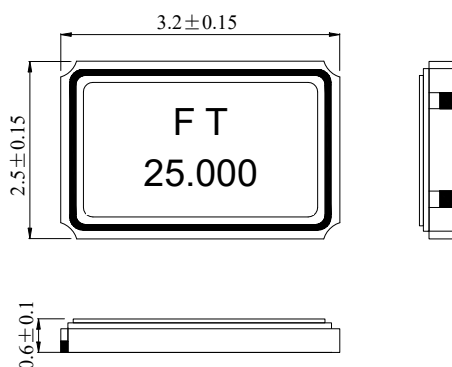
Standard atmospheric conditions

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

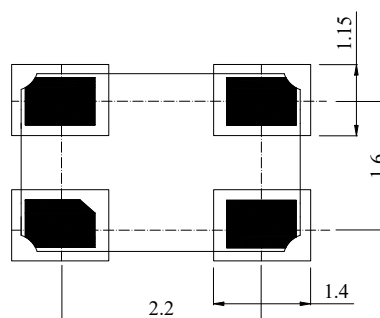
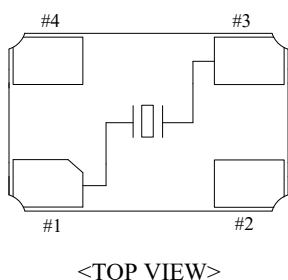
Ambient temperature : $25 \pm 3^{\circ}\text{C}$

Relative humidity : 40%~70%

2. FTX321S MARKING & DIMENSIONS



Marking #2, #4 is connected with metal cap of top.



Recommended Solder Pad Layout:

*Marking should be printed as following:

Logo, Nominal Frequency

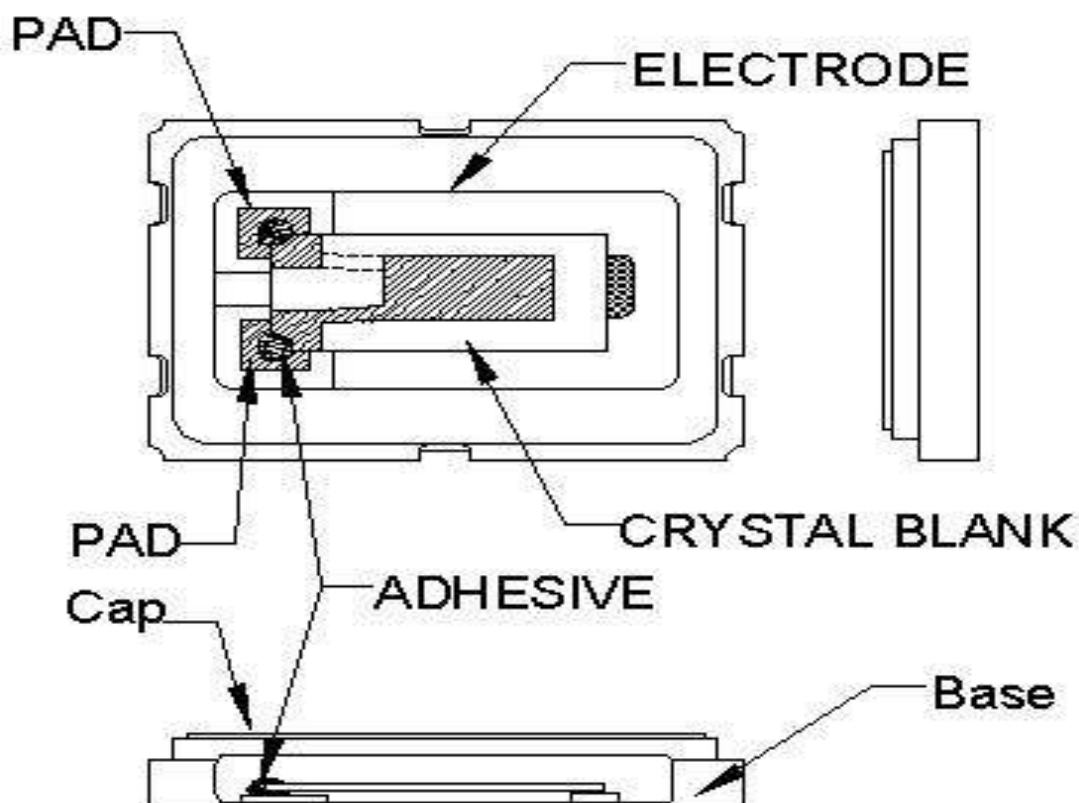
*Manufacturing Logo: FT

*Nominal frequency = 3 number after decimal point MAX.

(ex. 12.000 MHz → 12.000)

Marking: Laser marking

3. INSIDE STRUCTURE

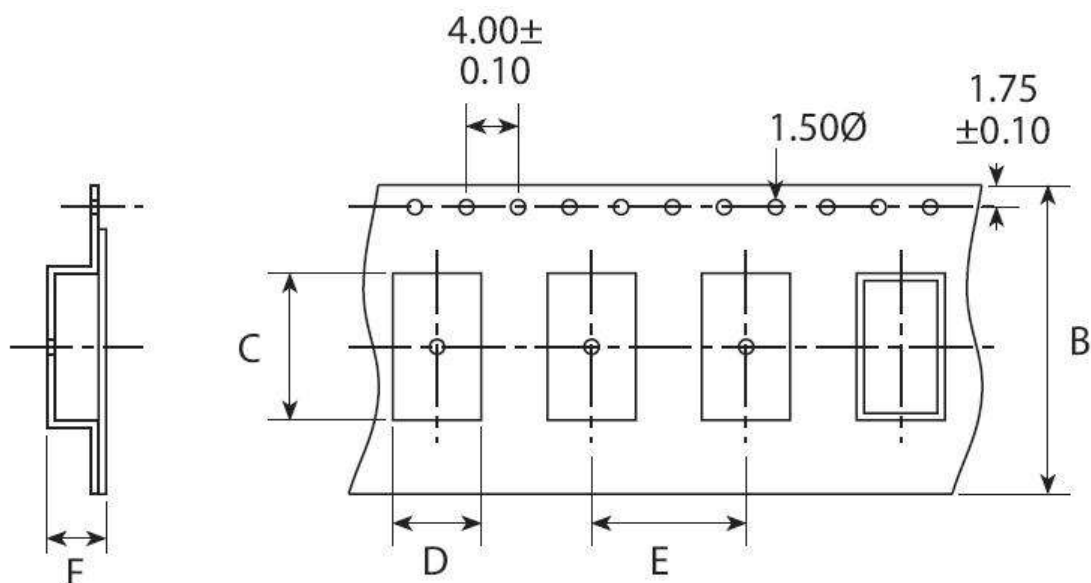


Reference drawing

Base:
Alumina Ceramic (Al_2O_3)
Metallized Pad: W
Ni Plating
Au Plating
Cap:
Fe-Ni
(3) Crystal Enclosure Seal:
Seal Seam
(4) Crystal Blank
Rectangular At-Cut Quartz Crystal Blank
(5) Adhesive
Silver Conductive Polyimide Resin
(6) Electrode
Ag
(7) PAD
Alumina Ceramic (W. Ni. Au)

4. FTX321S EMBOSS CARRIER TAPE & REEL

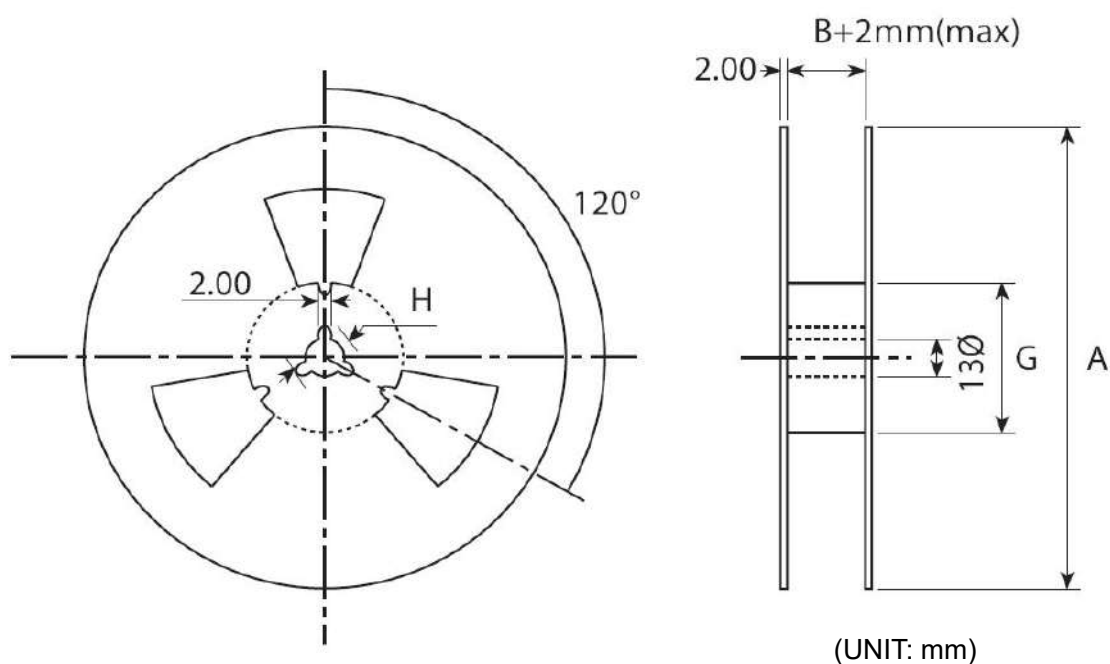
a.) Dimensions of Carrier Tape



	A	B	C	D	E	F	G
SMD3225	178 ± 2.0	8.0 ± 0.3	3.55 ± 0.10	2.80 ± 0.10	4.0 ± 0.1	0.85 ± 0.10	60.5 ± 1.0

b.) Dimensions of Reel

(UNIT: mm)



(UNIT: mm)

c.) Storage condition

Temperature: +40deg.C Max.

Relative Humidity: 80% Max.

d.) Standard packing quantity

3,000PCS / REEL

e.) Material of the tape

Tape	Material
Carrier tape	A – PET
Top tape	Polyester

f.) Label contents

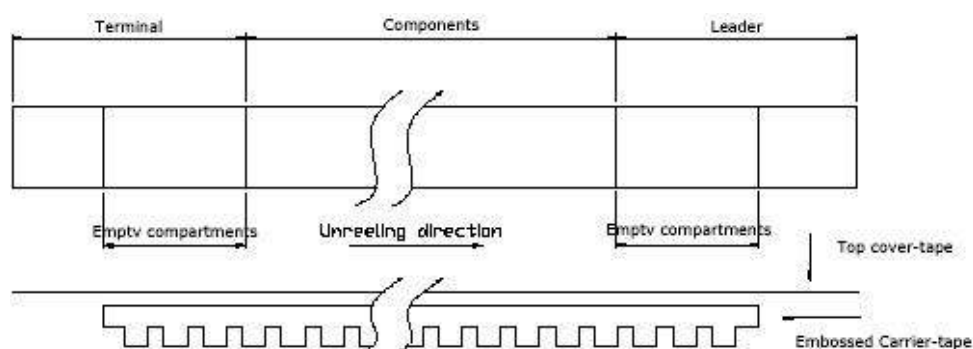
- .The type of product
- .Our specification No.
- .Your Part No.
- .Lot No.
- .Nominal Frequency
- .Quantity
- .Our Company Name

Sticks label for every reel.

PART NUMBER	
PO NO	
PR. NO:	
HOLDER TYPE	
FREQUENCY	
REMAKS	
QUANTITY	

g.) Taping dimension

Leader	Cover-tape	The length of cover-tape in the leader is more than 400 mm including empty embossed area.
	Carrier-tape	After all products were packaged, must remain more than twenty pieces or 400 mm empty area, which should be sealed by cover-tape.
Terminal	Cover-tape	The tip of cover-tape shall be fixed temporary by paper tape and roll around the core of reel one round.
	Carrier-tape	The empty embossed area which are sealed by top cover-tape must remain more the 40 mm.



h.) Joint of tape

The carrier-tape and top cover-tape should not be jointed.

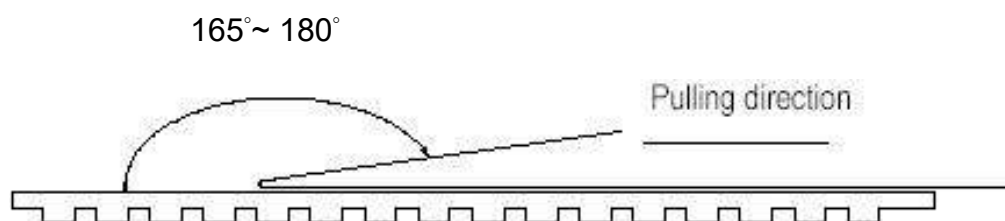
i.) Release strength of cover tape

It has to between 0.1N to 0.7N under following condition.

Pulling direction 165° to 180°

Speed 300mm/min.

Otherwise unless specified.



Other standards shall be based on JIS C 0806-1990.

5. Mechanical Endurance: Provided that measurement shall be carried out after letting it alone in the room temperature for 1 hour min.

	Item	Conditions	Specifications
5.1	Drop	Method: fallen on the concrete (thickness is 3cm or more) Height: 75 cm Direction: each direction of 3 mutually perpendicular (x、 y、 z) axis. Number of shocks: 2 shocks in each direction	Freq. Drift $\pm$ 5ppm Max Resistance Drift $\pm$ 15% Max
5.2	Vibration	Should be satisfied after supplying following vibration. (1)Vibration Frequency: 10~55Hz (2)Cycle: 1 to 2 Min. (3)Full Cycle: 1.5mm P-P. (4)Direction: X.Y.Z (5)Time: 2 Hours / Each Direction	Freq. Drift $\pm$ 5ppm Max Resistance Drift $\pm$ 15% Max
5.3	Substrate Bending	Mount the specimen on substrate. Apply the following pressure Direction: see Fig –1 Speed: 0.5 mm/sec Hours: 5 $\pm$ 1 sec Amount of substrate: 3 mm Max.	Without mechanical damage such as breaks. Without electrode peeling. Electrical characteristics shall be satisfied.
5.4	Adhesion	Mount the specimen on substrate. Apply the following pressure Direction: see Fig –2 Weight: 10N Hours: 10 $\pm$ 1 sec	
5.5	Body strength	Mount the specimen on substrate. Apply the following pressure Direction: see Fig –3 Weight: 10N Hours: 10 $\pm$ 1 sec	

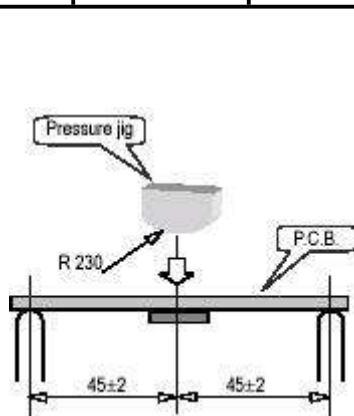


Fig-1

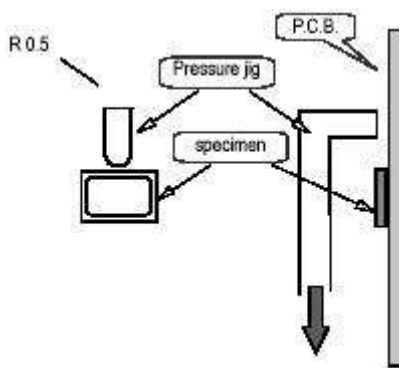


Fig-2

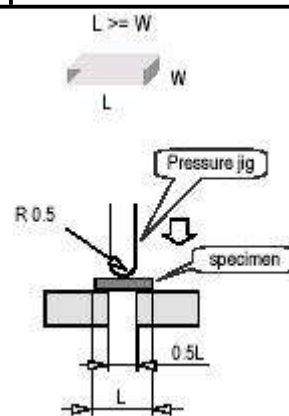
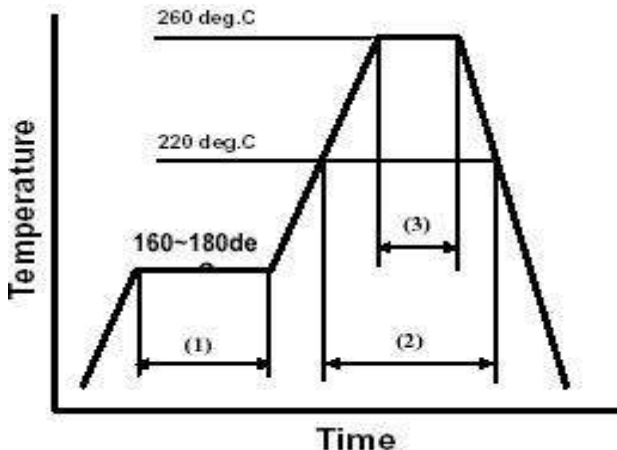


Fig-3

5.6	Seal	Less than 3.0×10^{-8} atm.cc/sec by Helium leak detector. Also, no serial bubble is observed by Fluorinate tests.													
5.7	Solder ability	3 sec Dip in $235^{\circ}\text{C} \pm 5^{\circ}\text{C}$ solder. (Use ROSIN type flux for solder.)	More than 90% of lead shall be covered by new solder.												
5.8	Resistance to Soldering Heat	Run in Reflow Reflow soldering shall be allowed Only two(2) time. Available for Lead Free Soldering  <table border="1" data-bbox="451 1525 1010 1653"> <tbody> <tr> <td>(1)</td><td>Preheat</td><td>160~180 deg.C</td><td>120sec.</td></tr> <tr> <td>(2)</td><td>Primary heat</td><td>220 deg.C</td><td>60sec.</td></tr> <tr> <td>(3)</td><td>Peak</td><td>260 deg.C</td><td>10sec. Max.</td></tr> </tbody> </table>		(1)	Preheat	160~180 deg.C	120sec.	(2)	Primary heat	220 deg.C	60sec.	(3)	Peak	260 deg.C	10sec. Max.
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6. Environmental Endurance: Provided that measurement shall be carried out after letting it alone in the room temperature for 1 hour min.

	Item	Conditions	Specifications
6.1	Humidity	Should be satisfied after letting it alone at $+60^{\circ}\text{C}\pm 2^{\circ}\text{C}$ in humidity of 90%~95% for 500 hours.	Freq. Drift $\pm 5\text{ppm}$ Max Resistance Drift $\pm 15\%$ Max
6.2	Storage in Low Temperature	Should be satisfied after letting it alone at $-40^{\circ}\text{C}\pm 3^{\circ}\text{C}$ for 500 hours.	Freq. Drift $\pm 5\text{ppm}$ Max Resistance Drift $\pm 15\%$ Max
6.3	Storage in High Temperature	Should be satisfied after letting it alone at $+85^{\circ}\text{C}\pm 3^{\circ}\text{C}$ for 500 hours.	Freq. Drift $\pm 5\text{ppm}$ Max Resistance Drift $\pm 15\%$ Max
6.4	Temperature Cycle	Should be satisfied after supplying the following temperature cycle (100 cycles). (Refer to Fig-4). Temperature shift from low to high, high to low shall be done in $1^{\circ}\text{C}/\text{min}$.	Freq. Drift $\pm 5\text{ppm}$ Max Resistance Drift $\pm 15\%$ Max

