Shoulder Electronics Limited

CRYSTAL SEPECIFICATION

Customer : _____

Customer P/N _____

Part Name : Tuning Fork Quartz Crystal

Product Description : ZM315-32.768-12.5-20

Issue Date : 2015.01.13

CUSTOMER'S APPROVAL

(PLEASE RETURN A COPY WITH APPOVAL

APPROVED	DESIGNER

REV.	Description of Revision History	Date	Designer	Checked By
A	New revision	2014-12-11	LEO	YORK

CRYSTAL SEPECIFICATION

1. Description: Tuning Fork Quartz Crystal
2. Nominal Frequency: 32.768KHz
3. Oscillation Mode: Fundamental
4. Cutting Mode: TF cut
5. Measurement Instrument: S&A 250B(Measured FL)
6. Electrical Characteristics:

[1]Operation Conditions:

Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Operating Temperature Range	Topt	-40		85	℃	
Storage Temperature Range	Tstg	-50		120	℃	
Load Capacitance	CL		12.5		pF	
Drive Level	DL		0.1	1	uW	

[2]Frequency Stability:

Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Tolerance	dF/Fo	-20		20	ppm	Refer to Center Frequency@25±3℃
Stability Over Temperature	dF/F25		-0.036		ppm/℃^{2}	Refer to Operating Temperature
Aging	dF/F25	-5		5	ppm	Per Year

dF/Fo:Frequency Deviation Refer to Center Frequency

dF/F25:Frequency Deviation Refer to 25℃ Frequency

[3]Electrical Performance:

Item	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Equivalent Series Resistance	ESR			70	KΩ	@Series
Shunt Capacitance	C0	0.6	0.9	1.2	pF	
Insulation Resistance	IR	500			MΩ	@DC 100 Volt

7. Marking:Laser

Marking Description.

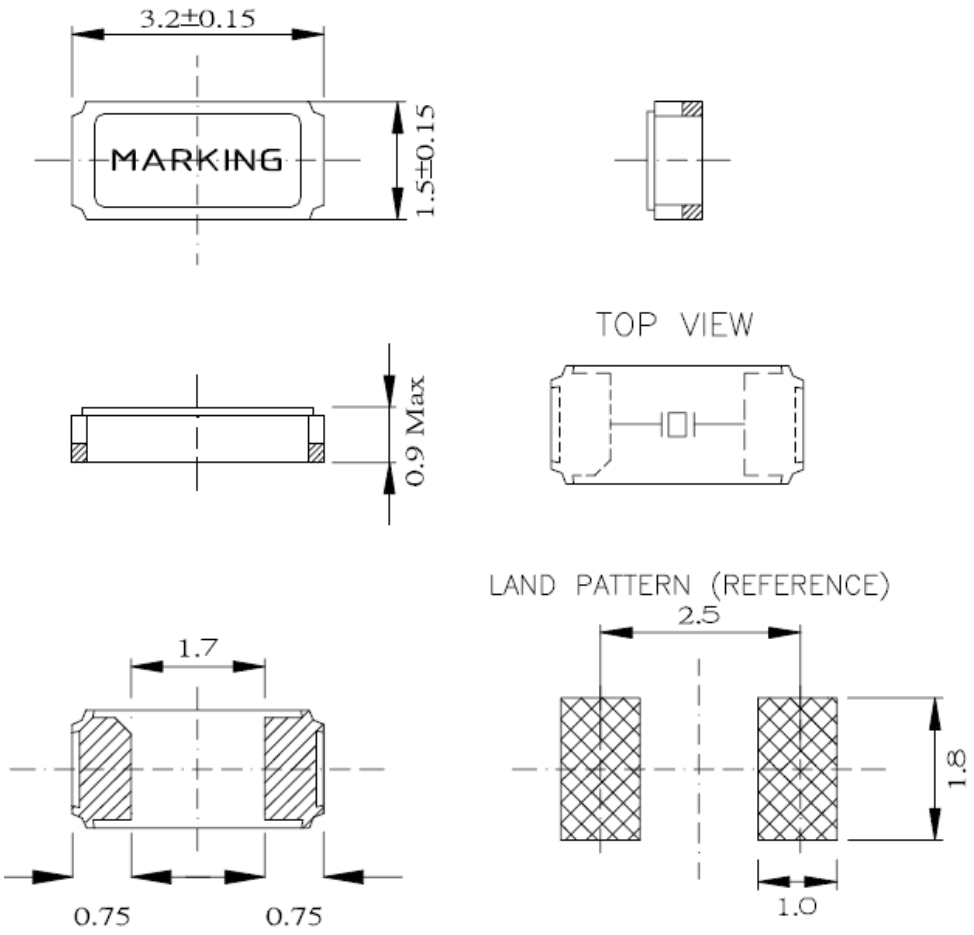
MARKING:
T: Tuning Fork Quartz Crystal

① **YEAR: 2015 2016 .....**
CODE: 5 6 .....

② **WEEK: 1th week ..... 10th week .....**
CODE: 01 ..... 10 .....

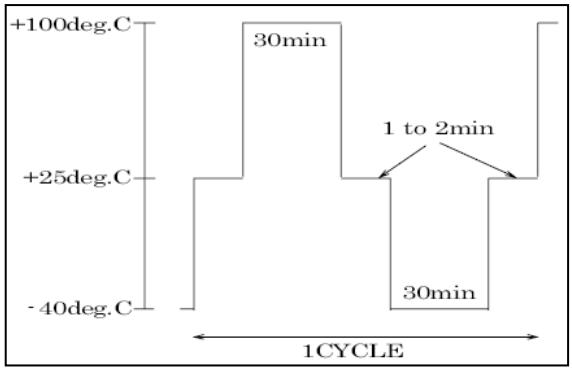
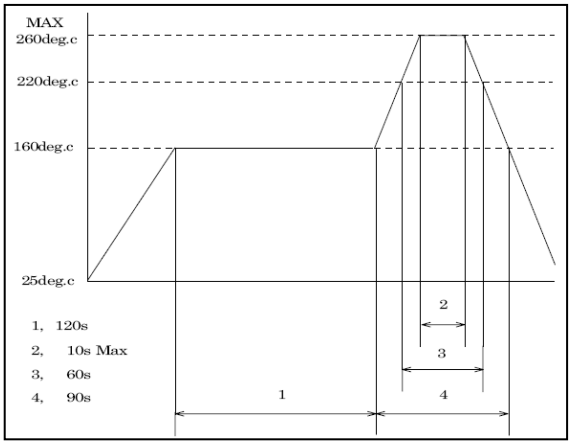
③ **Load Capacitance: A:12.5PF B:9PF C:7PF D:6PF**

8. Outline drawing (unit : mm)



9. Reliability Specification

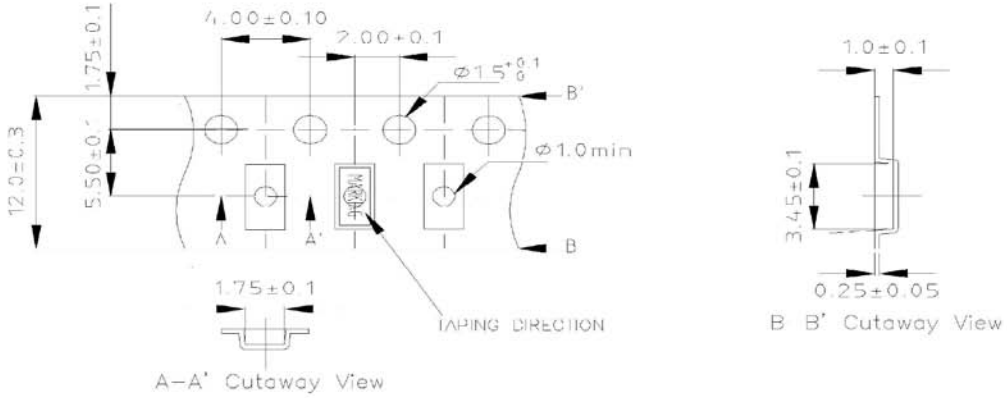
Test Items	Test Method and Condition	Requirements
Vibration	(1)Vibration Frequency 10 to 55Hz (2)Vibration Amplitude 1.5mm (3) Cycle Time 1-2min(10-55-10Hz) (4)Direction X.Y.Z (5)Duration 2h/each direction	Frequency Change:±10ppm Max. Resistance Change:±15% or 5kohm Max.
Shock	3 Times free drop from 75cm height to hard wooden board of thickness more than 30mm	Frequency Change:±10ppm Max. Resistance Change:±15% or 5kohm Max.
Hermetic seal	Helium leak detector Checked:before the molded crystal uints	less than 1 × 10 EXP(–7) mbar.l/sec.

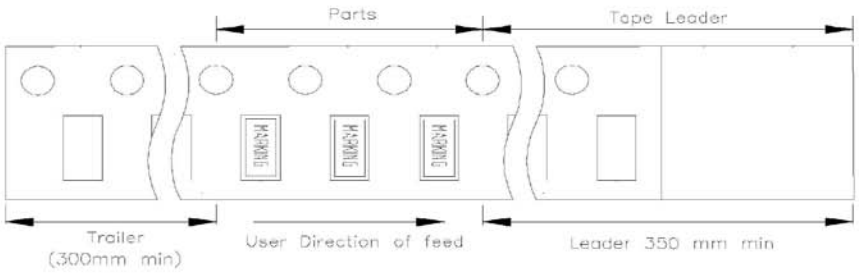
Solder ability	Dip the leads of crystal units into the solution (7-10%) of rosin 3±0.5s,then dip it into the tank 5-10s. Temperature of solder melted tank is 245℃±5℃	The dipped surface of the leads should be at least 95% covered with continuous new solder coating
High temperature	240 hours at +85℃±2℃ After 1-2hours past at room temperature from following	Frequency Change:±10ppm Max. Resistance Change:±25% or 10kohm Max.
Low temperature	240 hours at -20℃±2℃ After 1-2hours past at room temperature from following test.	Frequency Change:±10ppm Max. Resistance Change:±15% or 5kohm Max.
Humidity	240 hours at +40℃±2℃,relative humidity 90-95% After 1-2hours past at room temperature from following	Frequency Change:±10ppm Max. Resistance Change:±25% or 10kohm Max.
Temperature cycle	After supplying the following temperature cycle (50cycles) 	Frequency Change:±10ppm Max. Resistance Change:±25% or 10kohm Max.
Reflow soldering		After 24h past from frequency test, Frequency Change:±10ppm Max. Resistance Change:±25% or 10kohm Max. Notice: 1、Using the infrared lamp at soldering process may cause uneven temperature rise on plastic surface of the parts,so that please keep the package temperature within left conditions. 2、DO NOT dip the plastic part into solder

■ PACKING

Unit: mm

1. CARRIER TYPE





2. REEL： 3000PCS