EPSON(CHINA) CO., LTD. SHENZHEN BRANCH

Ref No: ETDSDM-FA23829.4912-071205-1

Product Catalog Information

Model	FA-238 series
Description	29.491200MHz 16pF +/-50PPM Lead-Free (for RoHS)
	FA238 29.491200M 16PF +/-50PPM

EPSON

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Specification for FA-238 series

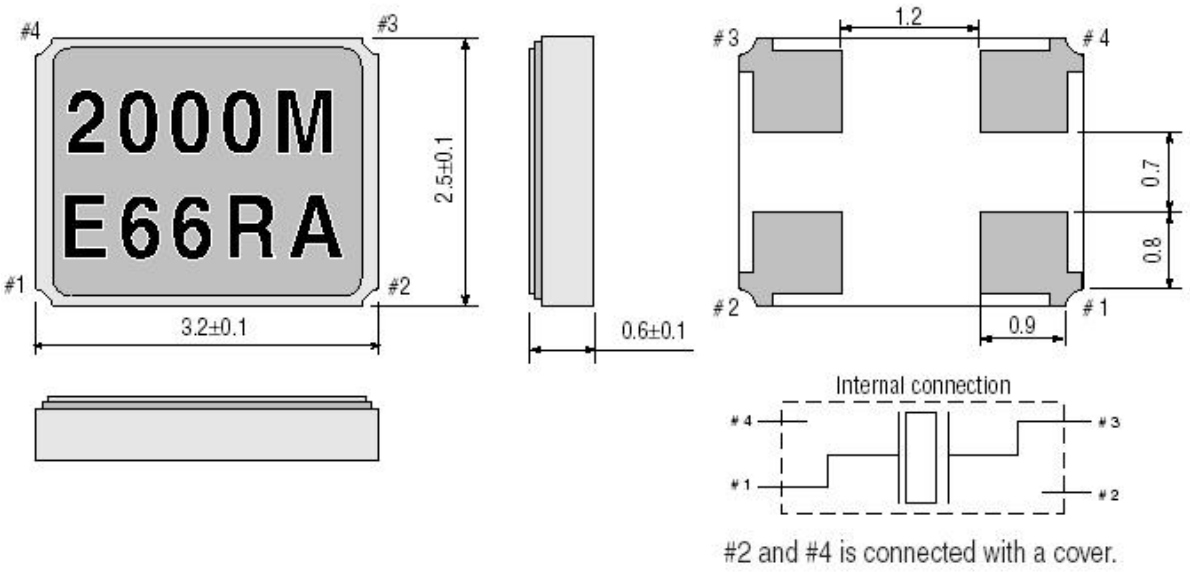
Item		Symbol	FA-238	Remark
Nominal Frequency range		f	29.491200MHz	Fundamental
Temperature	Storage	TSTG	-40 ◦ C to +125 ◦ C	Store as bare product after unpacking
	Operating	TOPR	-40 ◦ C to +85 ◦ C	Specified Equivalent series must be satisfied
Recommended drive level		DL	10uW to 100uW	
Frequency tolerance		△f/f	+/-50 x 10^{-6}(Standard)	Ta= +25 ◦ C
Frequency Temperature characteristic (Standard)			+/-30 x 10^{-6} Max	-20 to +70 ◦ C
Load capacitance		CL	16pF	
Series resistance		R1	60Ω Max	-40 ◦ C to +85 ◦ C, DL =100uW
Shunt Capacitance		C0	5pF Max	
Insulation resistance		IR	500MΩ Min	
Aging		fa	+/-5.0x10^{-6} /year Max	Ta=+25 ◦ C, first year
Shock resistance		S.R	+/-10 x10^{-6} Max	100g dummy drop from 1500mmheight on to the concrete 3 directions 10 times

Note 1:

1. The contents are subject to change without notice.
2. This sheet is not intended to guarantee or provide an approval of implementation of industrial patents
3. We have prepared this as carefully as possible. If you find it incomplete or unsatisfactory in any respect. We would welcome your comments

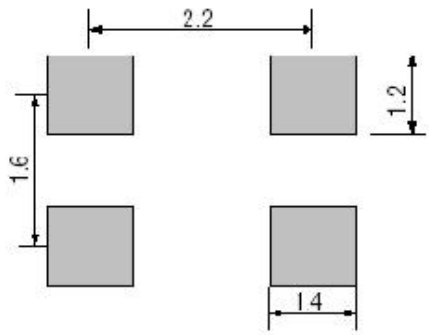
2. Dimensions of FA-238

Unit: mm

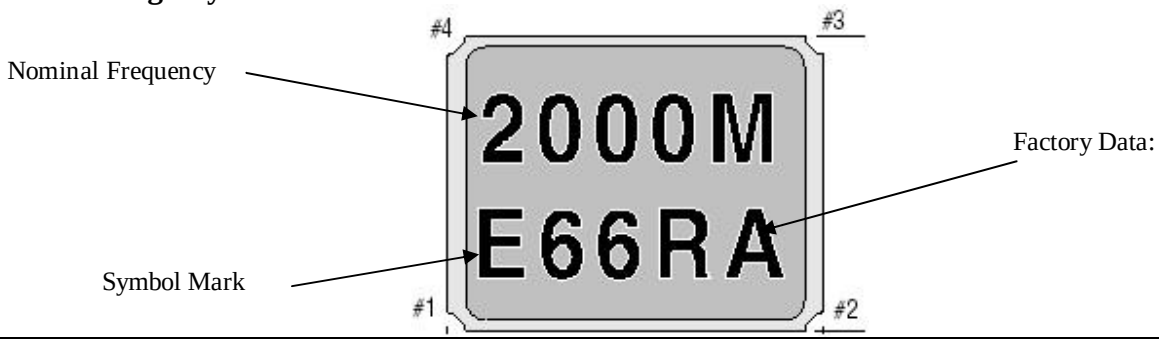


2.1 Recommended Soldering pattern

Unit: mm



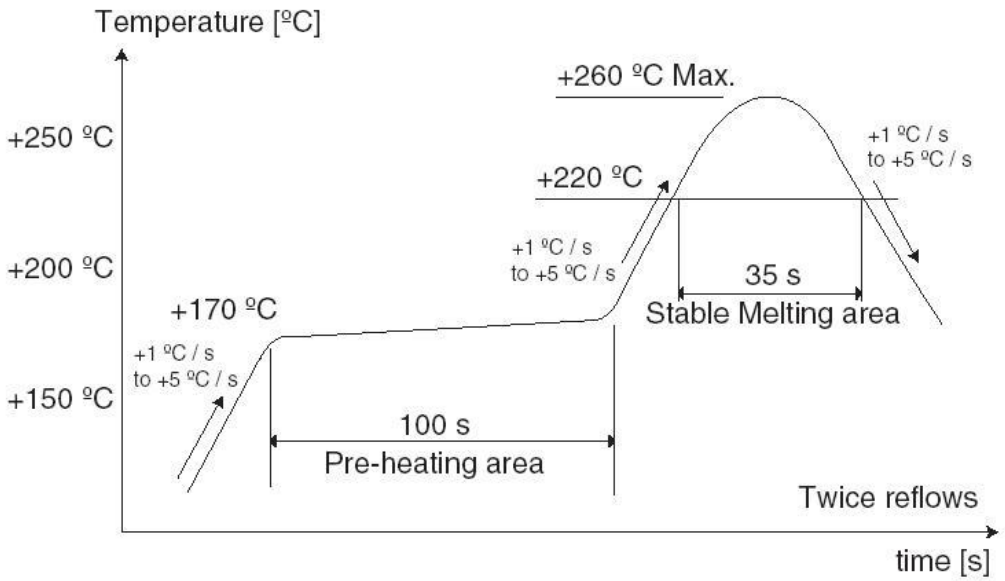
2.3 Marking Layout:



3. QD Product Packing Specification [Q22FA23800082]

Packing Specification Code XX	Name
00	[L] Tape & Reel 3,000pcs./Reel
01	Vinyl Bag
03	[R] Tape & Reel Std Q'ty/Reel
04	[R] Tape & Reel Any Q'ty/Reel
11	[L] Tape & Reel Any Q'ty/Reel
12	[L] Tape & Reel 250pcs. /Reel
13	[L] Tape & Reel 500pcs. /Reel

4. Recommended Reflow portfolio (SMD product)



Giving higher temperature over the following reflow condition to crystal product, even SMD products, may cause the characteristic to deteriorate. The reflow condition within following profile is recommendable. Please check always the soldering temperature and time before mounting these product.

Note 2: For Detail Handling precautions please refer to the Crystal master Product Catalog in applications guide.

Appendix :

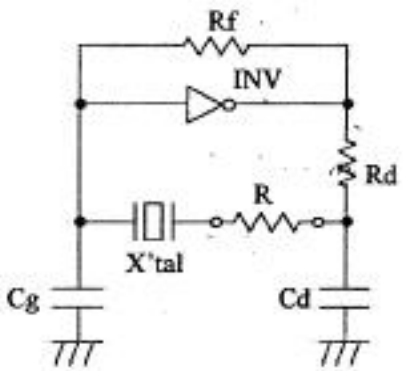
1. Max. tree(3) timed reflow is allowed. Once miss soldering is happen, hand work soldering by soldering iron is recommended. (+350°C × within 5 seconds)

2. Patterning should be followed by our recommended one.

3. Applying excessive excitation force to the crystal resonator may cause deterioration damage.

4. Unless adequate negative resistance is allocated in the oscillation circuit, start up time of oscillation may be increased, or no oscillation may occur. In order to avoid this, please provide enough negative resistance in the circuit design.

   How to check the negative resistance



   (1) Connect the resister(R) to the circuit in series with the crystal resonator.

   (2) Adjust R so that oscillation can start (or stop).

   (3) Measure R when oscillation just start (or stop) in above(2).

   (4) Get the negative resistance
   -R=R+CI value.

   (5) Recommended -R
   [-R]>CI × 5

5. The shortest line patterning on board is recommendable.
   Too long line on board may cause of abnormal oscillation.

6. To avoid malfunction, no pattern under or near the X'tal is allowed.
   Solder paste should be more than 150μm thickness.

7. This device must be stored at the normal temperature and humidity conditions before mounting on a board.

8. Too much exciting shock or vibration may cause deterioration on damage.
   Depending on the condition such as a shock in assembly machinery, the products may be damaged.
   Please check your condition in advance to maintain shock level to be smallest.

9. When used/stored under high humidity condition, there is potential problem with condensation.
   Please take precautions to prevent condensation.

10. Please refer to packing specification regarding how to storage the products in the pack.

11. This product can be subjected to ultrasonic cleaning. However, the oscillator may be affected depending on the conditions of the cleaning. Check conditions prior to use.