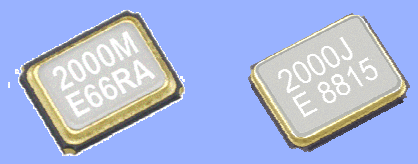
MHz RANGE CRYSTAL UNIT

FA-238V / FA-238
TSX-3225

- Frequency range : 12 MHz to 60 MHz(FA-238,FA-238V)
- External dimensions : 3.2 × 2.5 × 0.6 mm ⋯TSX-3225
  : 3.2 × 2.5 × 0.7 mm ⋯FA-238V / FA-238
- Overtone order : Fundamental
- Applications : Mobile phone, Bluetooth, W-LAN
  ISM band radio, Clock for MPU

Pb Free
RoHS Compliant

Product Number (please contact us)
FA-238V : Q22FA23V0xxxx17
FA-238 : Q22FA2380xxxx17
TSX-3225 : X1E000021xxxx16



Actual size

FA-238V/ FA-238	TSX-3225
	

Specifications (characteristics)

Item	Symbol	For Clock		For RF Reference	Conditions / Remarks
		FA-238V	FA-238	TSX-3225	
Nominal frequency range	f_nom	12.000 MHz to 15.999 MHz	16.000 MHz to 60.000 MHz	16.000 MHz to 48.000 MHz	Fundamental *1 Please contact us about available frequencies.
Storage temperature	T_stg	-40 °C to +125 °C			Storage as single product.
Operating temperature	T_use	-40 °C to +85 °C (+105 °C)			Please contact us about +85 °C < T_use
Level of drive	DL	200 µW Max.			Recommended: 1 to 100 µW
Frequency tolerance	f_tol	$\pm 50 \times 10^{-6}$ (standard), ($\pm 15 \times 10^{-6}$ to $\pm 50 \times 10^{-6}$ is available)		$\pm 10 \times 10^{-6}$	+25 °C Please contact us for requirements not listed in this specifications. *1
Frequency versus temperature characteristics	f_tem	$\pm 30 \times 10^{-6}$/-20 °C to +70 °C		$\pm 10 \times 10^{-6}$/-20 °C to +75 °C	Please contact us for requirements not listed in this specifications. *1
Load capacitance	CL	7 pF to ∞			Please specify.
Motional resistance (ESR)	R1	As per table below		As per table below	-40 °C to +85 °C, DL = 100 µW
Frequency aging	f_age	$\pm 5 \times 10^{-6}$ / year Max.		$\pm 1 \times 10^{-6}$ / year Max.*2	+25 °C, First year

*1 FA-238: For over 40 MHz, only the standard specification applies. *2 40 MHz ≤ f_nom : $\pm 2 \times 10^{-6}$ / year Max.

Motional resistance (ESR)

(FA-238V / FA-238) Frequency	Motional resistance
12.0 MHz ≤ f_nom ≤ 13.0 MHz	100 Ω Max.
13.0 MHz < f_nom < 20.0 MHz	80 Ω Max.
20.0 MHz ≤ f_nom < 25.0 MHz	60 Ω Max.
25.0 MHz ≤ f_nom < 30.0 MHz	50 Ω Max.
30.0 MHz ≤ f_nom ≤ 60.0 MHz	40 Ω Max.

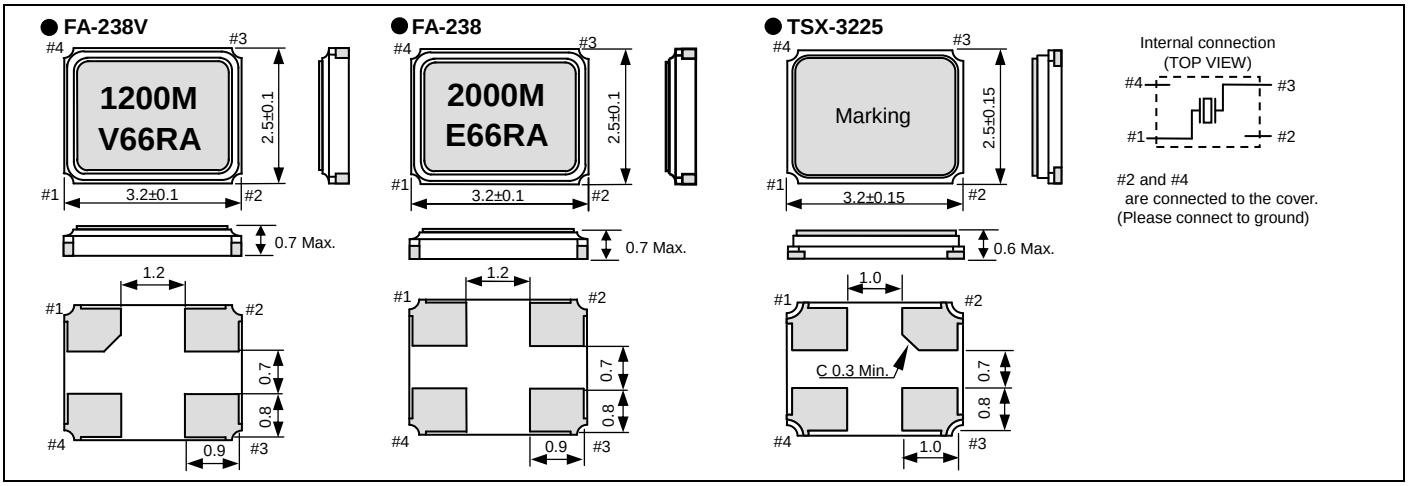
(TSX-3225) Frequency	Motional resistance
16.0 MHz ≤ f_nom < 21.0 MHz	60 Ω Max.
21.0 MHz ≤ f_nom ≤ 48.0 MHz	40 Ω Max.

Product name (Standard form): FA-238V ① 12.000000MHz ② 12.0 ③ +15.0-15.0 ④

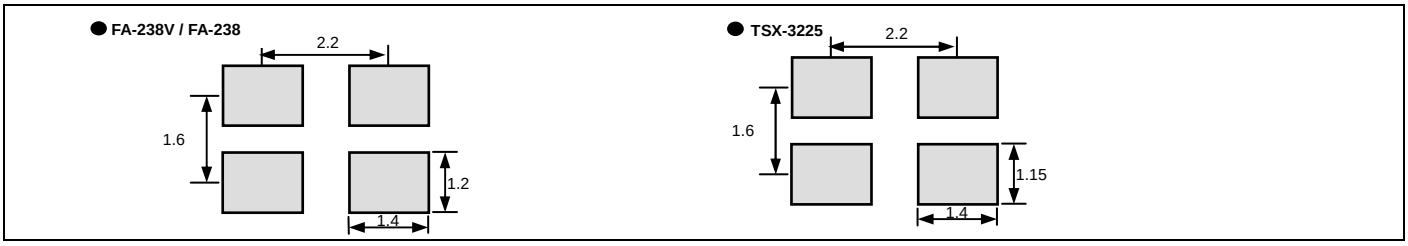
①Model ②Frequency ③Load capacitance(pF) ④Frequency tolerance($\times 10^{-6}$, +25 °C)

In addition to the above mentioned specification item, please specify frequency temperature characteristics and operating temperature range in case of inquiry.

External dimensions (Unit:mm)



Footprint (Recommended) (Unit:mm)



PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Seiko Epson, all environmental initiatives operate under the Plan-Do-Check-Action (PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard.

All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification.

ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

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In order provide high quality and reliable products and services than meet customer needs,

Seiko Epson made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

ISO/TS16949 is the international standard that added the sector-specific supplemental requirements for automotive industry based on ISO9001.

►Explanation of the mark that are using it for the catalog

Pb Free	►Pb free.
RoHS Compliant	►Complies with EU RoHS directive. *About the products without the Pb-free mark. Contains Pb in products exempted by EU RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.)
For Automotive	►Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
Automotive Safety	►Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc).

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