MHz RANGE CRYSTAL UNIT MINIATURE SIZE LOW PROFILE SMD

FA - 238V / FA - 238 TSX-3225

: 12 MHz to 60 MHz(FA-238,FA-238V) •Frequency range • 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

: Mobile phone, Bluetooth, W-LAN Applications

ISM band radio, Clock for MPU





Product Number (please contact us) FA-238V : Q22FA23V0xxxx00 FA-238V FA-238 : Q22FA2380xxxx00 TSX-3225 : X1E000021xxxx00





Actual size

FA-238V/FA-238 TSX-3225

4075 C

Specifications (characteristics)

Item Svr		For Clock	For RF Reference	Conditions / Remarks
item	Symbol	FA-238V FA-238	TSX-3225	Conditions / Remarks
Nominal frequency range	f_nom	12.000 MHz to 15.999 MHz 16.000 MHz 60.000 MHz		Fundamental *1 For the out of standard specifications, please contact us for inquiries.
Storage temperature	T_stg	-40 °C to +125 °C		Store as bare product.
Operating temperature	T_use	-40 °C to +85 °C		
Level of drive	DL	200 μW Max.		Recommended: 1 to 100 μW
Frequency tolerance	f_tol	$\pm 50 \times 10^{\text{-6}}$ (standard), ($\pm 15 \times 10^{\text{-6}}$ to $\pm 50 \times 10^{\text{-6}}$ is available	±10 × 10 ⁻⁶	+25 °C For the out of standard specifications, please contact us for inquiries. *1
Frequency versus temperature characteristics	f_tem	$\pm 30 \times 10^{\text{-6}}$ /-20 °C to +70 °C	±10 × 10 ⁻⁶ /-20 °C to +75 °	For the out of standard specifications, please contact us for inquiries. *1
Load capacitance	CL	7 pF to ∞		For the out of standard specifications, please contact us for inquiries.
Motional resistance (ESR)	R ₁	As per below table	As per below table	-40 °C to +85 °C, DL = 100 μW
Frequency aging	f_age	$\pm 5 \times 10^{-6}$ / year Max.	±1 × 10 ⁻⁶ / year Max.*2	+25 °C, First year

^{*1} FA-238: For over 40 MHz, only the standard specification applies.

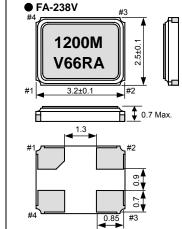
Motional resistance (ESR)

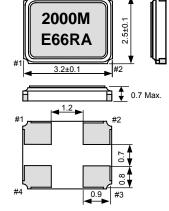
(FA-238V / FA-238) Frequency	Motional resistance
$12.0 \text{ MHz} \leq f_\text{nom} \leq 13.0 \text{ MHz}$	100 Ω Max.
13.0 MHz < f_nom < 20.0 MHz	80 Ω Max.
20.0 MHz ≤ f_nom < 25.0 MHz	60 Ω Max.
25.0 MHz ≤ f_nom < 30.0 MHz	50 Ω Max.
30.0 MHz ≤ f nom ≤ 60.0 MHz	40 Ω Max.

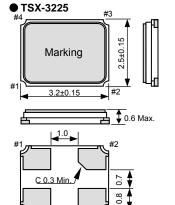
● FA-238

(TSX-3225) Frequency	Motional resistance
16.0 MHz ≤ f_nom < 21.0 MHz	60 Ω Max.
$21.0 \text{ MHz} \leq f_\text{nom} \leq 48.0 \text{ MHz}$	40 Ω Max.

External dimensions







#3

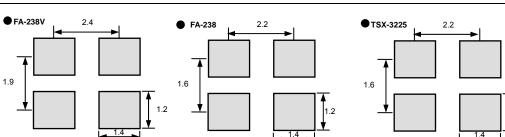


(Unit:mm)

(Unit:mm)

are connected to the cover. (Please connect to ground)

Footprint (Recommended)



^{*2 40} MHz \leq f_nom : \pm 2 \times 10⁻⁶ / year Max.

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.

WORKING FOR HIGH QUALITY

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.



- ► 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.)



▶ The products have been designed for high reliability applications such as Automotive.

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