

**CRYSTAL OSCILLATOR  
SPXO**

**TCO-708x series**

- Frequency range : 1.5 MHz to 160 MHz
- Supply voltage : 3.3 V / 5.0 V
- External dimensions: 7.0 × 5.0 × 1.6 mm
- Function : Standby (ST)



Product Number (please contact us)  
X1G0002x1xxxx00



Actual size



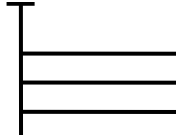
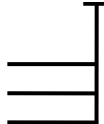
**Specifications (characteristics)**

Item	Symbol	TCO-708*X1A*	TCO-708*D1A*	Conditions / Remarks
Output frequency range	fo	1.500 MHz to 160.000 MHz	1.500 MHz to 75.000 MHz	Please contact us about available frequencies.
Supply voltage	Vcc	3.3 V	5.0 V	As per description below
Storage temperature range	T_stg	-55 °C to +125 °C		Storage as single product.
Operating temperature range	T_use	As per description below		
Frequency tolerance	f_tol	As per description below		
Current consumption	Icc	20 mA Max.	20 mA Max.	fo < 30 MHz, No load condition.
		50 mA Max.	40 mA Max.	30 MHz ≤ fo ≤ 75 MHz, No load condition.
Symmetry	SYM	40 % to 60 %		75 MHz < fo ≤ 160 MHz, No load condition.
		50 % Vcc level		
Output voltage	VOH	90 % Vcc Min.		IOH=-5mA(X1A) / -8mA(D1A)
	VOL	10 % Vcc Max.		IOL=+5mA(X1A) / +8mA(D1A)
Output load condition (CMOS)	L CMOS	15 pF Max.		
Input voltage	VIH	70 % Vcc Min.		VIH or OPEN : Enable
	VIL	30 % Vcc Max.		VIL or GND : Disable
Rise time / Fall time	tr / tf	6 ns Max.	10 ns Max.	fo ≤ 75 MHz, 10 % Vcc to 90 % Vcc level
		3 ns Max.	-	75 MHz < fo ≤ 160 MHz, 10 % Vcc to 90 % Vcc level
Start-up time	t_str	10 ms Max.		Time at minimum supply voltage to be 0 s
Frequency aging	f_aging	±5 × 10 <sup>-7</sup> / year Max.		+25 °C, First year

\* Part Number

**TCO - 7 0 8 1 A**

- <Frequency tolerance / Vcc tolerance>
- ±25 × 10<sup>-6</sup> Max. / Vcc ±5 % : 5
  - ±50 × 10<sup>-6</sup> Max. / Vcc ±10 % : 6
  - ±100 × 10<sup>-6</sup> Max. / Vcc ±10 % : 7

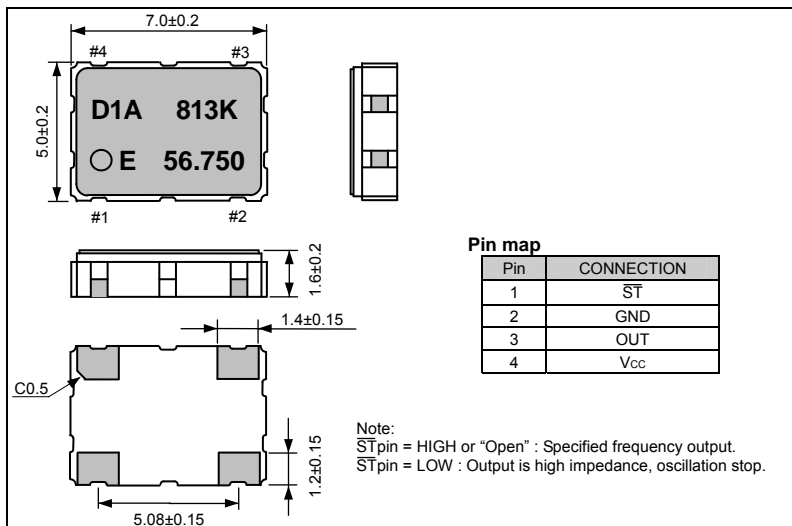


- <Operating temperature range>
- BLANK: 0 °C to +70 °C
  - 1: -10 °C to +70 °C
  - 2: -20 °C to +70 °C
  - 4: -40 °C to +85 °C (±50, ±100 × 10<sup>-6</sup> only)

- < Supply voltage / Frequency range>
- X : Vcc= 3.3 V / 1.5 MHz to 160 MHz
  - D : Vcc= 5.0 V / 1.5 MHz to 75 MHz

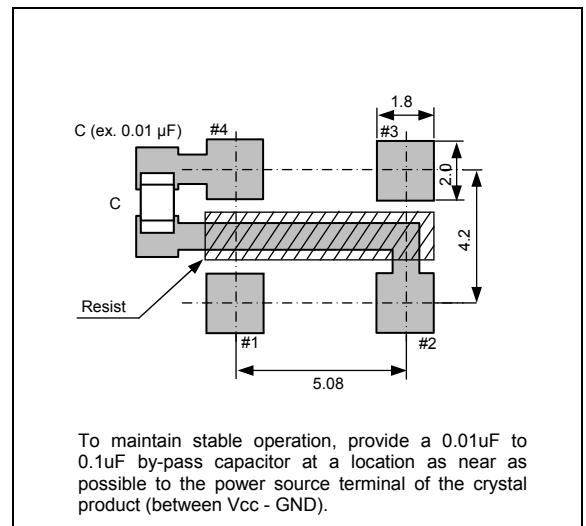
**External dimensions**

(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.




## 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

	<p>► Pb free.</p>
	<p>► 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.)</p>
	<p>► The products have been designed for high reliability applications such as Automotive.</p>

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