

**LOW-JITTER SAW OSCILLATOR (SPSO)**  
**OUTPUT : LV-PECL, LVDS**  
**For high temperature environment**



**Product Number**  
**XG-2123CA P: X1M000331xxxx00**  
**XG-2123CA L: X1M000371xxxx00**  
**XG-2103CA P: X1M000321xxxx00**  
**XG-2103CA L: X1M000361xxxx00**

**XG-2123CA**  
**XG-2103CA**



- Frequency range : 100 MHz to 700 MHz
- Supply voltage : 2.5 V ... XG-2123CA  
3.3 V ... XG-2103CA
- Output : LV-PECL or LVDS
- Function : Output enable (OE)
- External dimensions : 7.0 × 5.0 × 1.2 mm
- Low jitter and low phase noise by SAW unit.

**Specifications (characteristics)**

| Item                                 | Symbol                          | LV-PECL  |                | LVDS                               |  | Conditions / Remarks  |
|--------------------------------------|---------------------------------|--|----------------|------------------------------------|--|---|
|                                      |                                 | XG-2123CA P  | XG-2103CA P    | XG-2123CA L                        | XG-2103CA L  |   |
| Output frequency range               | f <sub>o</sub>                  | 100 MHz to 700 MHz   |                |                                    |  | Please contact us about available frequencies.  |
| Supply voltage                       | V <sub>cc</sub>                 | 2.5 V ± 0.125 V  | 3.3 V ± 0.33 V | 2.5 V ± 0.125 V                    | 3.3 V ± 0.33 V   |   |
| Storage temperature                  | T <sub>stg</sub>                | -55 °C to +125 °C  |                |                                    |  | Storage as single product.  |
| Operating temperature                | T <sub>use</sub>                | P: 0 °C to +70 °C, R: -5 °C to +85 °C, S: -20 °C to +70 °C |                |                                    |  |   |
| Frequency tolerance                  | f <sub>tol</sub>                | H: ±100 × 10 <sup>-6</sup>                                 |                |                                    |  |   |
| Current consumption                  | I <sub>cc</sub>                 | 60 mA Max.   |                | 30 mA Max.                         |  | OE=V <sub>cc</sub> , L ECL=50 Ω or L LVDS=100 Ω   |
| Disable current                      | I <sub>dis</sub>                | 2 mA Max.  |                | 15 mA Max.                         |  | OE=GND  |
| Symmetry                             | SYM                             | 45 % to 55 %   |                |                                    |  | At outputs crossing point   |
| Output voltage (LV-PECL)             | V <sub>OH</sub>                 | 1.55 V Typ.  | 2.35 V Typ.    | -                                  |  | DC characteristics  |
|                                      |                                 | V <sub>cc</sub> -1.025 V to V <sub>cc</sub> -0.88 V        |                | -                                  |  |   |
|                                      | V <sub>OL</sub>                 | 0.80 V Typ.  | 1.60 V Typ.    | -                                  |  |   |
| Output voltage (LVDS)                | V <sub>OD</sub>                 | -  |                | 350 mV Typ., 247 mV to 454 mV      | V <sub>OD1</sub> , V <sub>OD2</sub>                    | DC characteristics  |
|                                      | dV <sub>OD</sub>                | -  |                | 50 mV Max.                         | dV <sub>OD</sub> =  V <sub>OD1</sub> -V <sub>OD2</sub> |   |
|                                      | V <sub>OS</sub>                 | -  |                | 1.25 V Typ., 1.125 V to 1.375 V    | V <sub>OS1</sub> , V <sub>OS2</sub>                    |   |
|                                      | dV <sub>OS</sub>                | -  |                | 150 mV Max.                        | dV <sub>OS</sub> =  V <sub>OS1</sub> -V <sub>OS2</sub> |   |
| Output load condition (ECL) / (LVDS) | L ECL                           | 50 Ω   |                | -                                  |  | Terminated to V <sub>cc</sub> -2.0 V  |
|                                      | L LVDS                          | -  |                | 100 Ω                              |  | Connected between OUT to $\bar{O}UT$  |
| Input voltage                        | V <sub>IH</sub>                 | 70 % V <sub>cc</sub> Min.                                  |                |                                    |  | OE terminal   |
|                                      | V <sub>IL</sub>                 | 30 % V <sub>cc</sub> Max.                                  |                |                                    |  |   |
| Rise time / Fall time                | t <sub>r</sub> / t <sub>f</sub> | 400 ps Max.  |                |                                    |  | Between 20 % and 80 % of (V <sub>OH</sub> -V <sub>OL</sub> ).<br>Between 20 % and 80 % of Differential Output Peak to Peak voltage. |
| Start-up time                        | t <sub>str</sub>                | 10 ms Max.   |                |                                    |  | Time at minimum supply voltage to be 0 s  |
| Phase Jitter                         | t <sub>pj</sub>                 | 0.23 ps Max.   |                | 0.27 ps Max.                       |  | 100 MHz ≤ f <sub>o</sub> < 150 MHz  |
|                                      |                                 | 0.22 ps Max.   |                | 0.24 ps Max.                       |  | 150 MHz ≤ f <sub>o</sub> < 200 MHz  |
|                                      |                                 | 0.21 ps Max.   |                | 0.23 ps Max.                       |  | 200 MHz ≤ f <sub>o</sub> < 300 MHz  |
|                                      |                                 | 0.18 ps Max.   |                | 0.19 ps Max.                       |  | 300 MHz ≤ f <sub>o</sub> < 400 MHz  |
|                                      |                                 | 0.16 ps Max.   |                | 0.16 ps Max.                       |  | 400 MHz ≤ f <sub>o</sub> < 500 MHz  |
|                                      |                                 | 0.14 ps Max.   |                | 0.14 ps Max.                       |  | 500 MHz ≤ f <sub>o</sub> < 600 MHz  |
| 0.10 ps Max.                         |                                 | 0.10 ps Max.   |                | 600 MHz ≤ f <sub>o</sub> ≤ 700 MHz |  |   |
| Frequency aging                      | f <sub>age</sub>                | H: Included in Frequency tolerance                         |                |                                    |  | Max operating temperature, 5 years,<br>V <sub>cc</sub> =2.5 V, 3.3 V  |

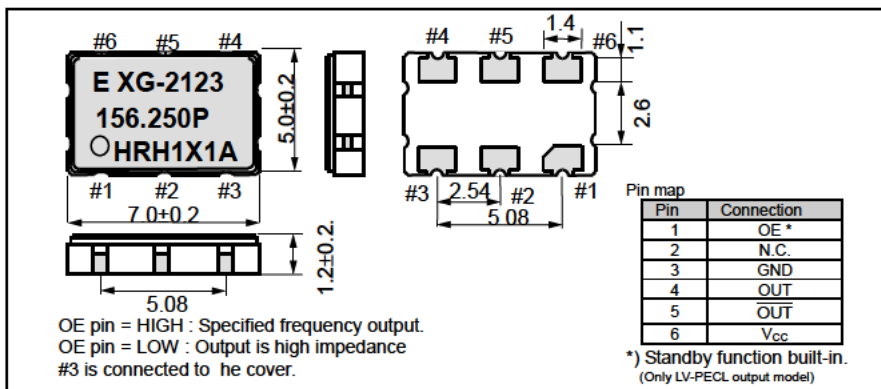
Product Name **XG-2123 CA 156.250000MHz P H R H**  
 (Standard form) ① ② ③ ④⑤⑥⑦  
 ①Model ②Package type ③Frequency  
 ④Output(P:LV-PECL, L:LVDS)  
 ⑤Frequency tolerance ⑥Operating temperature  
 ⑦Frequency aging (H\*1: Frequency tolerance include aging)

|                      |                         |                  |                  |
|----------------------|-------------------------|------------------|------------------|
| ⑤Frequency tolerance |                         | ⑥Operating temp. |                  |
| H                    | ±100 × 10 <sup>-6</sup> | P                | 0 °C to +70 °C   |
|                      |                         | R                | -5 °C to +85 °C  |
|                      |                         | S                | -20 °C to +70 °C |

\*1 This includes initial frequency tolerance, temperature variation, supply voltage change, reflow drift and estimation of 5 years aging at max operating temperature.

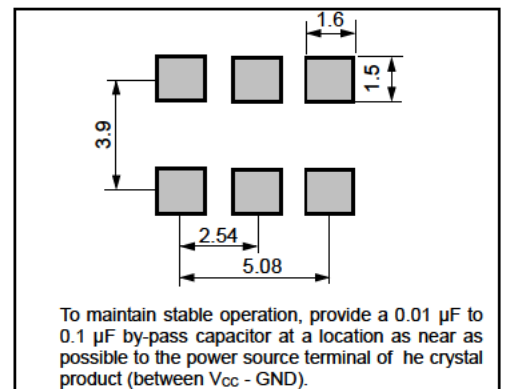
**External dimensions**

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

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

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