

# CRYSTAL OSCILLATOR

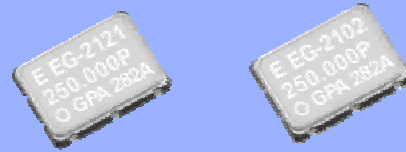
## LOW-JITTER SAW OSCILLATOR

# EG-2121 / 2102CA series

- Frequency range : 53.125 MHz to 700 MHz
- Supply voltage : 2.5 V (EG-2121CA)  
3.3 V (EG-2102CA)
- Output : Differential LV-PECL or LVDS
- Function : Output enable(OE)
- Thickness : 1.2 mm Typ.
- Very low jitter and low phase noise by SAW unit.



Product Number (please contact us)  
EG-2121CA: Q3805CAx0xxxx00  
EG-2102CA: Q3806CA00xxxx00



Actual size

EG-2121CA

EG-2102CA

### Specifications (characteristics)

| Item                         | Symbol                | EG-2121CA  | EG-2102CA          | EG-2121CA                      | EG-2102CA                  | Remarks   |
|------------------------------|-----------------------|--|--------------------|--------------------------------|----------------------------|---|
|                              |                       | Differential LV-PECL                                       |                    | LVDS                           |                            |   |
| Output frequency range       | $f_0$                 | 53.125 MHz to 500 MHz                                      | 100 MHz to 700 MHz | 53.125 MHz to 700 MHz          |                            | Please contact us for inquiries regarding available frequencies.                          |
| Supply voltage               | $V_{cc}$              | 2.5 V $\pm 0.125$ V  | 3.3 V $\pm 0.3$ V  | 2.5 V $\pm 0.125$ V            | 3.3 V $\pm 0.3$ V          |   |
| Temperature range            | Storage temperature   | -40 °C to +100 °C  |                    |                                |                            | Store as bare product after unpacking   |
|                              | Operating temperature | P: 0 °C to +70 °C, R: -5 °C to +85 °C, S: -20 °C to +70 °C |                    |                                |                            |   |
| Frequency tolerance          | $f_{tol}$             | G: $\pm 50 \times 10^{-6}$ , H: $\pm 100 \times 10^{-6}$   |                    |                                |                            | Please contact us for inquiries about S spec.<br>P: 0 °C to +70 °C, R: -5 °C to +85 °C *1 |
| Current consumption          | $I_{cc}$              | 80 mA Max.   | 100 mA Max.        | 30 mA Max.                     | 45 mA Max.                 | OE= $V_{cc}$ , RL=50 $\Omega$ or 100 $\Omega$   |
| Disable current              | $I_{dis}$             | 20 mA Max.   | 32 mA Max.         | 20 mA Max.                     | 30 mA Max.                 | OE=GND  |
| Symmetry                     | SYM                   | P: 45 % to 55 %  | P: 45 % to 55 %    | L: 45 % to 55 %                | L: 45 % to 55 %            | $f_0=350$ MHz (at outputs crossing point) *1  |
| Output voltage               | $V_{OH}$              | 1.55 V Typ.  | 2.35 V Typ.        | —                              |                            | DC characteristics  |
|                              |                       | $V_{cc}-1.025$ V to $V_{cc}-0.88$ V                        |                    | —                              |                            |   |
|                              | $V_{OL}$              | 0.8 V Typ.   | 1.6 V Typ.         | —                              |                            |   |
|                              | $V_{OD}$              | —  |                    | 350 mV Typ. 247 mV to 454 mV   |                            | Differential output, DC characteristics   |
|                              | $\Delta V_{OD}$       | —  |                    | 50 mV                          |                            |   |
|                              | $V_{OS}$              | —  |                    | 1.25 V Typ. 1.125 V to 1.375 V |                            |   |
| $\Delta V_{OS}$              | —                     |  | 150 mV             |                                | Offset, DC characteristics |   |
| Output load condition        | $R_L$                 | 50 $\Omega$  |                    | 100 $\Omega$                   |                            | LV-PECL: Terminated to $V_{cc} - 2.0$ V<br>LVDS: Connected between OUT to OUT             |
| Output enable input voltage  | $V_{IH}$              | 70 % $V_{cc}$ Min.   |                    |                                |                            | OE terminal   |
| Output disable input voltage | $V_{IL}$              | 30 % $V_{cc}$ Max.   |                    |                                |                            | OE terminal   |
| Rise time / Fall time        | $t_r / t_f$           | 400 ps Max.  |                    |                                |                            | LV-PECL: 80 % to 20 % ( $V_{OH}-V_{OL}$ )<br>LVDS: 80 % to 20 % ( $V_{OD} \times 2$ )     |
| Start-up time                | $t_{str}$             | 10 ms Max.   |                    |                                |                            | Time at minimum supply voltage to be 0 s  |
|                              | $t_{DJ}$              | 0.2 ps Typ.  |                    |                                |                            |   |
|                              | $t_{RJ}$              | 3 ps Typ.  |                    |                                |                            |   |
|                              | $t_{RMS}$             | 3 ps Typ.  |                    |                                |                            |   |
|                              | $t_{p-p}$             | 25 ps Typ.   |                    |                                |                            |   |
|                              | $t_{acc}$             | 4 ps Typ.  |                    |                                |                            |   |
| Phase Jitter                 | $t_{PJ}$              | 0.05 $\times 10^{-3}$ UI Typ.                              |                    |                                |                            | Offset frequency: 12 kHz to 20 MHz  |
|                              |                       | 1 ps Max.  |                    |                                |                            |   |
| Frequency aging *3           | $f_{aging}$           | $\pm 10 \times 10^{-6}$ / year Max.                        |                    |                                |                            | +25 °C, First year, $V_{cc}=2.5$ V, 3.3 V   |

\*1 As per below table.

\*2 Based on DTS-2075 Digital timing system made from WAVECREST with jitter analysis software VISI6.

\*3 Except: \*\*A

| Output mode                    | P: Differential LV-PECL  | D: Differential LV-PECL                  | L: LVDS  | V: LVDS            |        |
|--------------------------------|--|--|--|--------------------|--------|
| Frequency range                | All range  | $f_0 \leq 175$ MHz<br>$f_0 \leq 350$ MHz | All range  | $f_0 \leq 175$ MHz |        |
| Symmetry                       | 50 $\pm 10$ % ( $f_0 > 350$ MHz)<br>50 $\pm 5$ % ( $f_0 \leq 350$ MHz) | 50 $\pm 2$ %                             | 50 $\pm 10$ % ( $f_0 > 350$ MHz)<br>50 $\pm 5$ % ( $f_0 \leq 350$ MHz) | 50 $\pm 2$ %       |        |
| Details of frequency tolerance |  |  |  |                    |        |
| Frequency tolerance            | A *4   | N *5                                     | A *4   | N *5               |        |
|                                | HP: $\pm 100 \times 10^{-6}$ (0 °C to +70 °C)                          | PHPA                                     | PHPN   | DHPA               | DHPN   |
|                                | HR: $\pm 100 \times 10^{-6}$ (-5 °C to +85 °C)                         | PHRA*6                                   | PHRN*6   | DHRA*6             | DHRN*6 |
|                                | GP: $\pm 50 \times 10^{-6}$ (0 °C to +70 °C)                           | PGPA*6                                   | PGPN*6   | DGPA*6             | DGPN*6 |
|                                | —  | PGRN*6                                   | —  | DGRN*6             |        |
|                                | —  | —  | —  | LGRN*6             |        |
|                                | —  | —  | —  | —                  |        |
|                                | —  | —  | —  | —                  |        |

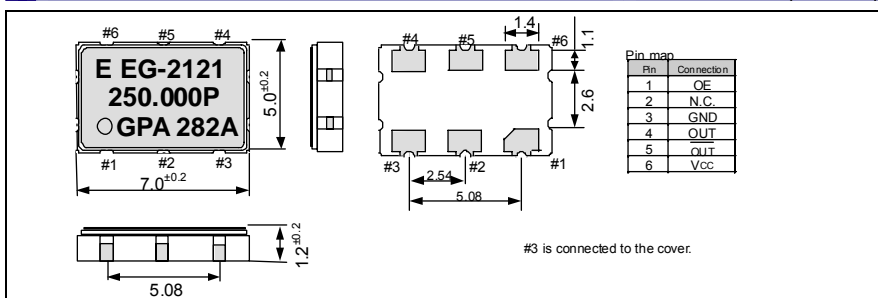
\*4 This includes initial frequency tolerance, temperature variation, supply voltage variation, reflow drift, and aging (+25 °C, 10 years).

\*5 This includes initial frequency tolerance, temperature variation, supply voltage variation, and reflow drift (except aging).

\*6 53.125 MHz  $\leq f_0 < 100$  MHz: Unavailable.

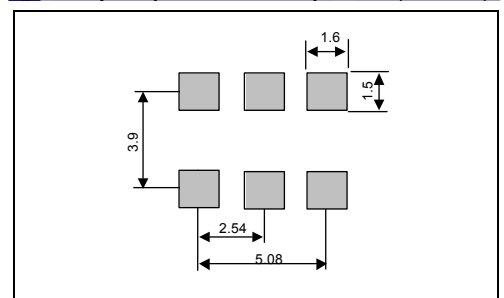
### External dimensions

(Unit:mm)



### Footprint (Recommended)

(Unit:mm)



# “QMEMS” EPSON TOYOCOM

In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a “3D (three device) strategy” designed to drive both horizontal and vertical growth. We will to grow our three device categories of “Timing Devices”, “Sensing Devices” and “Optical Devices”, and expand vertical growth through a combination of products from these categories.

A Quartz MEMS is any high added value quartz device that exploits the characteristics of quartz crystal material but that is produced using MEMS (micro-electro-mechanical system) processing technology.

Market needs are advancing faster than previously imagined toward smaller, more stable crystal products, but we will stay ahead of the curve by rolling out products that exceed market speed and quality requirements. We want to further accelerate the 3D strategy by QMEMS.

Quartz devices have become crucial in the network environment where products are increasingly intended for broadband, ubiquitous applications and where various types of terminals can transfer information almost immediately via LAN and WAN on a global scale. Epson Toyocom Corporation addresses every single aspect within a network environment. The new corporation offers “Digital Convergence” solutions to problems arising with products for consumer use, such as, core network systems and automotive systems.



## PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Epson Toyocom, 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.

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

All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification. In the future, new group companies will be expected to acquire the certification around the third year of operations.

## WORKING FOR HIGH QUALITY

In order to provide high quality and reliable products and services than meet customer needs, Epson Toyocom 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.

QS-9000 is an enhanced standard for quality assurance systems formulated by leading U.S. automobile manufacturers based on the international ISO 9000 series.

ISO/TS 16949 is a global standard based on QS-9000, a severe standard corresponding to the requirements from the automobile industry.

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

|  |   |
|--|---|
|  | <ul style="list-style-type: none"> <li>► Pb free.</li> <li>► Complies with EU RoHS directive.</li> </ul>  |
|  | <ul style="list-style-type: none"> <li>► Pb free terminal designed. Contains Pb in products exempted by RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.)</li> <li>► Complies with EU RoHS directive.</li> </ul> |
|  | <ul style="list-style-type: none"> <li>► The products have been designed for high reliability applications such as Automotive.</li> </ul>   |

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  - / traffic control equipment / and others requiring equivalent reliability.
- In this new crystal master for Epson Toyocom, product codes and markings will remain as previously identified prior to the merger. Due to the on-going strategy of gradual unification of part numbers, please review product codes and markings, as they will change during the course of the coming months.

We apologize for the inconvenience, but we will eventually have a unified part numbering system for Epson Toyocom that will be user friendly.