



## CRYSTAL OSCILLATOR (SPXO)

OUTPUT : LV-PECL, LVDS

SG3225EAN / VAN  
SG5032EAN / VAN  
SG7050EAN / VAN

- Achieved wide frequency range by PLL technology and AT crystal units
- Frequency range : 73.5 MHz to 700 MHz
- Supply voltage : 2.5 V to 3.3 V
- Function : Output enable (OE)
- Output : LV-PECL or LVDS



Product Number (please contact us)

SG3225EAN: X1G004251xxxx00

SG3225VAN: X1G004241xxxx00

SG5032EAN: X1G004271xxxx00

SG5032VAN: X1G004261xxxx00

SG7050EAN: X1G004291xxxx00

SG7050VAN: X1G004281xxxx00

SG3225EAN/VAN  
(3.2 × 2.5 × 1.05 mm)  
Actual sizeSG5032EAN/VAN  
(5.0 × 3.2 × 1.0 mm)SG7050EAN/VAN  
(7.0 × 5.0 × 1.4 mm)

SG3225EAN/VAN

SG5032EAN/VAN

SG7050EAN/VAN



## Specifications (characteristics)

| Item                                 | Symbol                          | Specifications                                                                       |                                   | Conditions / Remarks                                                                                                                              |                    |
|--------------------------------------|---------------------------------|--------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
|                                      |                                 | LV-PECL                                                                              | LVDS                              |                                                                                                                                                   |                    |
|                                      |                                 | SG3225EAN / SG5032EAN / SG7050EAN                                                    | SG3225VAN / SG5032VAN / SG7050VAN |                                                                                                                                                   |                    |
| Output frequency range               | f <sub>o</sub>                  | 73.5 MHz to 700 MHz                                                                  |                                   | Please contact us about available frequencies.                                                                                                    |                    |
| Supply voltage                       | V <sub>cc</sub>                 | K: 2.5 V - 10 % to 3.3 V + 10 %                                                      |                                   |                                                                                                                                                   |                    |
| Storage temperature                  | T <sub>stg</sub>                | -40 °C to +125 °C                                                                    |                                   | Storage as single product.                                                                                                                        |                    |
| Operating temperature                | T <sub>use</sub>                | B: -20 °C to +70 °C, G: -40 °C to +85 °C                                             |                                   |                                                                                                                                                   |                    |
| Frequency tolerance                  | f <sub>tol</sub>                | J: ± 50 × 10 <sup>-6</sup> , E: ± 30 × 10 <sup>-6</sup> , C: ± 20 × 10 <sup>-6</sup> |                                   |                                                                                                                                                   |                    |
| Current consumption                  | I <sub>cc</sub>                 | 65 mA Max.                                                                           | 30 mA Max.                        | OE = V <sub>cc</sub> , L <sub>ECL</sub> = 50 Ω or L <sub>LVDS</sub> = 100 Ω                                                                       |                    |
| Disable current                      | I <sub>dis</sub>                | 20 mA Max.                                                                           |                                   | OE = GND                                                                                                                                          |                    |
| Symmetry                             | SYM                             | 45 % to 55 %                                                                         |                                   | At outputs crossing point                                                                                                                         |                    |
| Output voltage (LV-PECL)             | V <sub>OH</sub>                 | V <sub>cc</sub> - 1.0 V to V <sub>cc</sub> - 0.8 V                                   | —                                 | DC characteristics                                                                                                                                |                    |
|                                      | V <sub>OL</sub>                 | V <sub>cc</sub> - 1.78 V to V <sub>cc</sub> - 1.62 V                                 | —                                 |                                                                                                                                                   |                    |
| Output voltage (LVDS)                | V <sub>OD</sub>                 | —                                                                                    | 250 mV to 450 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>                 | —                                                                                    | 1.15 V to 1.35 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 <sub>ECL</sub>                | 50 Ω                                                                                 | —                                 | Terminated to V <sub>cc</sub> -2.0 V                                                                                                              |                    |
|                                      | L <sub>LVDS</sub>               | —                                                                                    | 100 Ω                             | Connected between OUT to $\overline{\text{OUT}}$                                                                                                  |                    |
| 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> | 350 ps Max.                                                                          | 300 ps Max.                       | LV-PECL: Between 20 % and 80 % of (V <sub>OH</sub> -V <sub>OL</sub> ).<br>LVDS: Between 20 % and 80 % of Differential Output peak to peak voltage |                    |
| Start-up time                        | t <sub>str</sub>                | 3 ms Max.                                                                            |                                   | Time at minimum supply voltage to be 0 s                                                                                                          |                    |
| Phase Jitter                         | t <sub>pj</sub>                 | 0.6 ps Max. <sup>*1</sup>                                                            |                                   | Offset frequency: 12 kHz to 20 MHz                                                                                                                |                    |
| Frequency aging                      | f <sub>aging</sub>              | ± 5 × 10 <sup>-6</sup> / year Max.                                                   |                                   | +25 °C, First year, V <sub>cc</sub> = 2.5 V, 3.3 V                                                                                                |                    |

<sup>\*1</sup> 0.9 ps Max. (f<sub>o</sub> = 243 MHz ~ 250 MHz, 486 MHz ~ 500 MHz)

Product Name SG3225 EAN 156.250000MHz K J G A (⑤⑥: CG is not available)

(Standard form)

① Model ② Output (E: LV-PECL, V: LVDS) ③ Frequency ④ Supply voltage ⑤ Frequency tolerance

⑥ Operating temperature ⑦ Internal identification code ("A" is default)

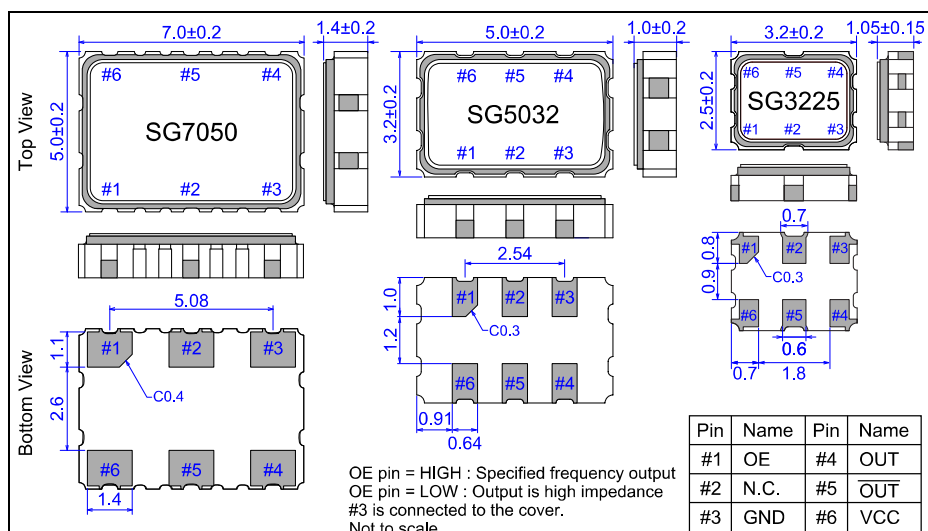
| ④ Supply voltage |               |
|------------------|---------------|
| K                | 2.5 V ~ 3.3 V |

| ⑤ Frequency tolerance |                        |
|-----------------------|------------------------|
| J                     | ±50 × 10 <sup>-6</sup> |
| E                     | ±30 × 10 <sup>-6</sup> |
| C                     | ±20 × 10 <sup>-6</sup> |

| ⑥ Operating temperature |                 |
|-------------------------|-----------------|
| B                       | -20 °C ~ +70 °C |
| G                       | -40 °C ~ +85 °C |

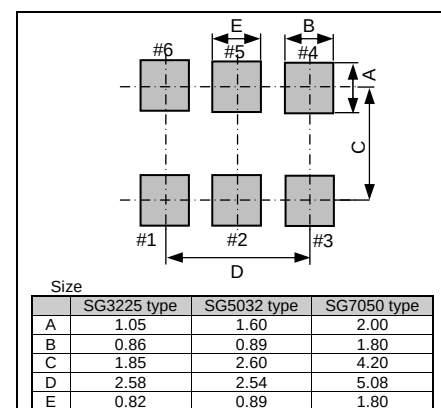
## External dimensions

(Unit: mm)



## Footprint (Recommended)

(Unit: mm)



To maintain stable operation, provide a 0.01 μF to 0.1 μF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between V<sub>cc</sub> - GND).

## 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.<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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