

**CRYSTAL OSCILLATOR (SPXO)**  
**OUTPUT : LV-PECL, LVDS**



**Product Number**  
 SG3225EEN: X1G005221xxxx00 (fo ≤ 200 MHz)  
 X1G005511xxxx00 (fo > 200 MHz)  
 SG5032EEN: X1G005531xxxx00  
 SG7050EEN: X1G005131xxxx00 (fo ≤ 200 MHz)  
 X1G005551xxxx00 (fo > 200 MHz)  
 SG3225VEN: X1G005351xxxx00 (fo ≤ 200 MHz)  
 X1G005521xxxx00 (fo > 200 MHz)  
 SG5032VEN: X1G005541xxxx00  
 SG7050VEN: X1G005331xxxx00 (fo ≤ 200 MHz)  
 X1G005561xxxx00 (fo > 200 MHz)

**SG3225 / 5032 / 7050EEN**  
**SG3225 / 5032 / 7050VEN**

- Frequency range : 25 MHz to 500 MHz
- Supply voltage : 2.5 V Typ. / 3.3 V Typ.
- Output : LV-PECL or LVDS
- Function : Output enable (OE)
- Phase jitter : 50 fs Typ. (fo = 156.25 MHz, LV-PECL)
- Operating temperature : -40 °C to +105 °C



**Specifications (characteristics)**

| Item                     | Symbol            | Specifications                               |   | Conditions / Remarks   |   |
|--------------------------|-------------------|--|---|--|---|
|                          |                   | LV-PECL<br>SG3225EEN / SG5032EEN / SG7050EEN | LVDS<br>SG3225VEN / SG5032VEN / SG7050VEN |  |   |
| Output frequency range   | fo                | 25 MHz to 500 MHz<br>200.1 MHz to 500 MHz    |   | Except for SG5032EEN / SG5032VEN / SG5032VEN<br>Please contact us for available frequencies.                   |   |
| Supply voltage           | V <sub>CC</sub>   | D: 2.5 V ± 0.125 V, C: 3.3 V ± 0.165 V       |   |  |   |
| Storage temperature      | T <sub>stg</sub>  | -55 °C to +125 °C                            |   |  |   |
| Operating temperature    | T <sub>use</sub>  | G: -40 °C to +85 °C, H: -40 °C to +105 °C    |   |  |   |
| Frequency tolerance      | f <sub>tol</sub>  | D: ±25 × 10 <sup>-6</sup> Max.               |   | Includes initial frequency tolerance, temperature variation, supply voltage change and 5 years aging (+25 °C)  |   |
|                          |                   | J: ±50 × 10 <sup>-6</sup> Max.               |   | Includes initial frequency tolerance, temperature variation, supply voltage change and 10 years aging (+25 °C) |   |
|                          |                   | L: ±100 × 10 <sup>-6</sup> Max.              |   | Refer to figure *1   |   |
| Current consumption      | I <sub>CC</sub>   | 60 mA Max.                                   | 25 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>  | 25 mA Max.                                   | 15 mA Max.                                | OE = GND   |   |
| Symmetry                 | SYM               | 45 % to 55 %                                 |   | At output crossing point   |   |
| Output voltage (LV-PECL) | V <sub>OH</sub>   | V <sub>CC</sub> - 1.1 V Min.                 |   | DC characteristics   |   |
|                          | V <sub>OL</sub>   | V <sub>CC</sub> - 1.5 V Max.                 |   |  |   |
| Output voltage (LVDS)    | V <sub>OD</sub>   | 250 mV to 450 mV                             |   | Differential output voltage, V <sub>OD1</sub> , V <sub>OD2</sub>   |   |
|                          | 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                             |   | Offset voltage, V <sub>OS1</sub> , V <sub>OS2</sub>  |   |
|                          | dV <sub>OS</sub>  | 50 mV Max.                                   |   | dV <sub>OS</sub> =  V <sub>OS1</sub> - V <sub>OS2</sub>  |   |
| Output load condition    | 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 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/Fall times          | tr / tf           | 0.3 ns Max.                                  | 0.3 ns Max.                               | V <sub>CC</sub> = 3.3 V,<br>25 MHz ≤ fo ≤ 200 MHz  | 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 |
|                          |                   | 0.35 ns Max.                                 |   | All other  |   |
| Startup time             | t <sub>str</sub>  | 10 ms Max.                                   |   | Time at minimum supply voltage to be 0 s   |   |

**Phase Jitter**

| Product Name                      | 100 MHz    | 125 MHz    | 156.25 MHz | 200 MHz    | 312.5 MHz  | 491.52 MHz | Conditions                            |
|-----------------------------------|------------|------------|------------|------------|------------|------------|---------------------------------------|
| SG3225EEN / SG5032EEN / SG7050EEN | 75 fs Typ. | 60 fs Typ. | 50 fs Typ. | 40 fs Typ. | 30 fs Typ. | 20 fs Typ. | Offset frequency:<br>12 kHz to 20 MHz |
| SG3225VEN / SG5032VEN / SG7050VEN | 90 fs Typ. | 70 fs Typ. | 60 fs Typ. | 50 fs Typ. | 40 fs Typ. | 30 fs Typ. |                                       |

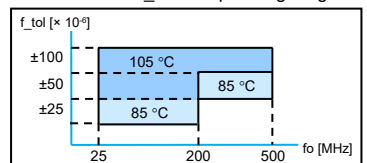
Product Name **SG3225 EEN 156.250000MHz C D G A** (⑤⑥: Unavailable code DH, DG and JH at fo > 200 MHz, Refer to figure \*1)

(Standard form) ① ② ③ ④⑤⑥⑦

\*1 : Maximum T<sub>use</sub> of operating range

- 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 | ⑤ Frequency tolerance     | ⑥ Operating temperature |
| C 3.3 V Typ.     | D ±25 × 10 <sup>-6</sup>  | G -40 to +85 °C         |
| D 2.5 V Typ.     | J ±50 × 10 <sup>-6</sup>  | H -40 to +105 °C        |
|                  | L ±100 × 10 <sup>-6</sup> |                         |



**External dimensions**

(Unit:mm)

SG7050EEN / SG7050VEN  
 SG5032EEN / SG5032VEN  
 SG3225EEN / SG3225VEN

Pin map

| Pin | Connection                      |
|-----|---------------------------------|
| 1   | OE                              |
| 2   | N.C. (Open or V <sub>CC</sub> ) |
| 3   | GND                             |
| 4   | OUT                             |
| 5   | OUT                             |
| 6   | V <sub>CC</sub>                 |

Note:  
 OE pin = HIGH or "Open": Specified frequency output.  
 OE pin = LOW: Output is high impedance

**Footprint (Recommended)**

(Unit:mm)

|   | SG3225EEN / SG3225VEN | SG5032EEN / SG5032VEN | SG7050EEN / SG7050VEN |
|---|-----------------------|-----------------------|-----------------------|
| A | 1.05                  | 1.60                  | 2.00                  |
| B | 0.92                  | 0.89                  | 1.80                  |
| C | 1.85                  | 2.60                  | 4.20                  |
| D | 2.58                  | 2.54                  | 5.08                  |
| E | 0.80                  | 0.89                  | 1.80                  |

In order to achieve optimum jitter performance, it is recommended that 0.1 μF and 10 μF bypass capacitors should be connected between V<sub>CC</sub> and GND and placed as close to the V<sub>CC</sub> pin as possible.

## 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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IATF 16949 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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