

**CRYSTAL OSCILLATOR (SPXO)**

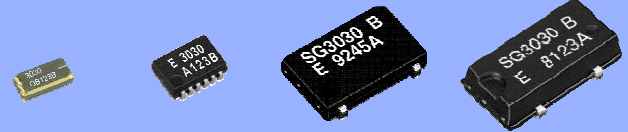
32.768 kHz

**SG-3030CM/LC/JF/JC**  
**SG-3040LC/JC**

- Built-in 32.768 kHz crystal unit allows adjustment-free efficient operation.
- Use of C-MOS IC enables reduction of current consumption.
- V<sub>io</sub> controls swing amplitude.



Product Number (please contact us)  
 SG-3030CM : X1B000211xxxx00  
 SG-3030LC : Q3102LC02000100  
 SG-3030JF : Q3102JF02000100  
 SG-3030JC : Q3102JC02000100  
 SG-3040LC : Q3103LC02000100  
 SG-3040JC : Q3103JC01000100



Actual size

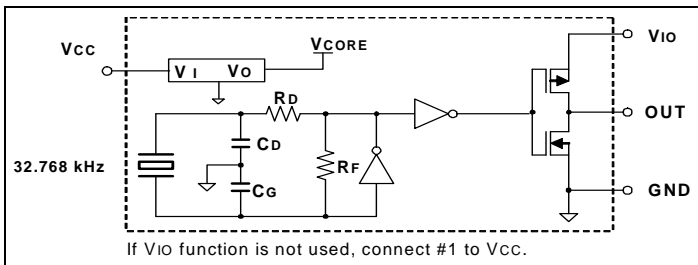
| CM Type. | LC Type. | JF Type. | JC Type. |
|----------|----------|----------|----------|
|          |          |          |          |

**Specifications (characteristics)**

| Item                              | Symbol                          | Specifications                                   |                                | Conditions / Remarks   |
|-----------------------------------|---------------------------------|--|--------------------------------|--|
|                                   |                                 | SG-3030CM/LC/JF/JC                               | SG-3040LC/JC                   |  |
| Output frequency range            | f <sub>o</sub>                  | 32.768 kHz                                       |                                |  |
| Supply voltage                    | V <sub>cc</sub>                 | 1.5 V to 5.5 V                                   | 0.9 V to 3.6 V                 |  |
| Interface power supply voltage    | V <sub>io</sub>                 | 1.5 V to 5.5 V                                   | 0.9 V to 3.6 V                 |  |
| Storage temperature               | T <sub>stg</sub>                | -55 °C to +125 °C                                |                                | Storage as single product  |
| Operating temperature             | T <sub>use</sub>                | -40 °C to +85 °C                                 |                                |  |
| Frequency tolerance               | f <sub>tol</sub>                | 5 ±23 × 10 <sup>-6</sup>                         |                                | +25 °C, V <sub>cc</sub> =3.3 V (SG-3040: V <sub>cc</sub> =1.2 V)   |
| Frequency temperature coefficient | f <sub>o</sub> -T <sub>c</sub>  | +10 × 10 <sup>-6</sup> / -120 × 10 <sup>-6</sup> |                                | -20 °C to +70 °C (+25 °C is reference)   |
| Frequency / voltage coefficient   | f <sub>o</sub> -V <sub>cc</sub> | ±2 × 10 <sup>-6</sup> / V Max.                   | ±5 × 10 <sup>-6</sup> / V Max. | +25 °C   |
| Current consumption               | I <sub>cc</sub>                 | 2 μA Max.  | 3.1 μA Max.                    | 3.3 V, No load condition   |
| Symmetry                          | SYM                             | 45 % to 55 %                                     |                                | 1/2 V <sub>cc</sub> (V <sub>io</sub> )level (SG-3040: V <sub>io</sub> =1.2 V to 3.6 V)   |
| Output voltage                    | V <sub>OH</sub>                 | V <sub>io</sub> -0.4 V Min.                      |                                | I <sub>OH</sub> =0.4 mA (SG-3040: V <sub>io</sub> =1.2 V to 3.6 V)   |
|                                   | V <sub>OL</sub>                 | 0.4 V Max.                                       |                                | I <sub>OL</sub> = 0.4 mA (SG-3040: V <sub>io</sub> =1.2 V to 3.6 V)  |
| Output load condition (CMOS)      | L <sub>CMOS</sub>               | 15 pF Max.                                       |                                | CMOS load  |
| Rise time / Fall time             | t <sub>r</sub> / t <sub>f</sub> | 200 ns Max.                                      | 100 ns Max.                    | CMOS load:20 % V <sub>cc</sub> (V <sub>io</sub> ) to 80 % V <sub>cc</sub> (V <sub>io</sub> )level (SG-3040: V <sub>io</sub> =1.2 V to 3.6 V) |
| Start-up time                     | t <sub>str</sub>                | 1 s Max.   | 3 s Max.                       | Time at minimum Supply voltage to be 0 s   |
| Frequency aging                   | f <sub>aging</sub>              | ±5 × 10 <sup>-6</sup> / year Max.                |                                | +25 °C, V <sub>cc</sub> = 3.3 V, First year  |

Unless otherwise stated, characteristics (specifications) shown in the above table are based on the rated operating temperature and voltage condition.

**Block diagram**



Product name  
(Standard form)

SG-3030 LC   32.768000kHz   B

①   ②   ③   ④

① Model   ② Package type   ③ Frequency

④ Frequency tolerance (B: 5±23×10<sup>-6</sup>, +25 °C)

**External dimension and Footprint (Recommended)**

(Unit:mm)

**SG-3030LC/3040LC**

\*Stop using the glue  
Any glue must never use it after soldering LC-package to a circuit board. This product has glass on the back side of a package. When glue invasions between circuit board side and glass side, then glass cracks by thermal expansion of glue. In this case a crystal oscillation stops. Consider glue abolition or glue do not touch to LC-package

Pin map

| Pin | Connection      | Pin | Connection      |
|-----|-----------------|-----|-----------------|
| 1   | V <sub>io</sub> | 12  | V <sub>cc</sub> |
| 2   | N.C.            | 11  | N.C.            |
| 3   | N.C.            | 10  | N.C.            |
| 4   | N.C.            | 9   | N.C.            |
| 5   | N.C.            | 8   | N.C.            |
| 6   | GND             | 7   | OUT             |

**SG-3030JF**

Pin map

| Pin | Connection      |
|-----|-----------------|
| 1   | V <sub>io</sub> |
| 2   | GND             |
| 3   | OUT             |
| 4   | V <sub>cc</sub> |

**SG-3030JC/3040JC**

Pin map

| Pin | Connection      |
|-----|-----------------|
| 1   | V <sub>io</sub> |
| 2   | GND             |
| 3   | OUT             |
| 4   | V <sub>cc</sub> |

**SG-3030CM**      **SG-3030LC/3040LC**      **SG-3030JF**      **SG-3030JC/3040JC**

Pin map

| Pin | Connection      |
|-----|-----------------|
| 1   | V <sub>io</sub> |
| 2   | GND             |
| 3   | OUT             |
| 4   | V <sub>cc</sub> |

To maintain stable operation, provide a 0.01μF to 0.1μF 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.

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In order provide high quality and reliable products and services than meet customer needs,

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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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