

**Press Release**  
**March 2009**

## **Epson Toyocom Develops World's Smallest 32.678-kHz Crystal Oscillator**

**Munich, 18th of March 2009:** Epson Toyocom Corporation, the leader in crystal devices, has developed the world's smallest 32.768-kHz crystal oscillator <sup>(\*)</sup>. The maximum dimensions of the new crystal oscillator, known as the SG-3050BC, are just 2.2 mm x 1.4 mm x 1.0t mm. With a footprint and cubic volume that are 70% and 75% smaller, respectively, than the 3.6 mm x 2.8 mm x 1.2t mm dimensions of its predecessor, the SG-3030LC, the new crystal oscillator will help electronic equipment manufacturers further downsize their products while boosting performance. Samples of the SG-3050BC will be available from March 2009.

In today's world 32.768-kHz crystal devices are indispensable as clocks, microcontroller subclocks and timer functions in a variety of applications, including compact portable consumer products such as cell phones and digital still cameras. They are also essential for industrial measuring instruments and machine tools and for in-vehicle systems such as navigation systems, GPS modules, and engine control units.

Moreover, 32.768-kHz reference clocks are also combined with 32.768-kHz tuning-fork crystal units and oscillation circuits for use in a single package.

In recent years heightened awareness of the need to reduce environmental impacts has been driving demand for ever more compact electronic devices that maintain greater functionality while consuming fewer raw materials and less power. As tuning-fork crystal units and oscillation circuits become smaller it is becoming increasingly difficult to design combinations with equal or superior stability and power consumption compared to their predecessors. There is demand for smaller oscillators that satisfy such performance requirements.

Epson Toyocom has responded by developing the ultra-compact 32.768-kHz SG-3050BC crystal oscillator. Epson Toyocom has already previously released industry-leading, ultra-compact 32.768-kHz tuning-fork crystal units, like the FC-12M, with maximum dimensions of 2.0 mm x 1.2 mm x 0.6t mm, and established services to support oscillation circuit design, such as "The Latest in Low-Frequency Oscillation Circuits!" ([http://www.epsontoyocom.co.jp/english/tech/note/pdf/latest\\_lfo.pdf](http://www.epsontoyocom.co.jp/english/tech/note/pdf/latest_lfo.pdf)). With the addition of the SG-3050BC to the lineup, Epson Toyocom now offers comprehensive solutions for both ultra-compact crystal units and oscillators.

The SG-3050BC, equipped with an ultra-compact QMEMS <sup>(\*\*)</sup> crystal chip, is the world's smallest 32.768-kHz crystal oscillator with built-in crystal unit. Epson Toyocom was able to shrink the size of this oscillator by using a new structure. The new structure applies Epson Toyocom's original NPO (New Platform Oscillator) structure <sup>(\*\*\*)</sup>, wherein a crystal unit in a ceramic package is sealed together with an oscillation circuit in a molded plastic housing. Combining a compact crystal unit with an oscillation circuit rather than providing them separately significantly shrinks the space required. The crystal oscillators will also pay dividends in the form of greater system reliability and quality, since the crystal unit's characteristics will be assured prior to shipment, alleviating the need for customers to design oscillation circuits or adjust output frequencies.

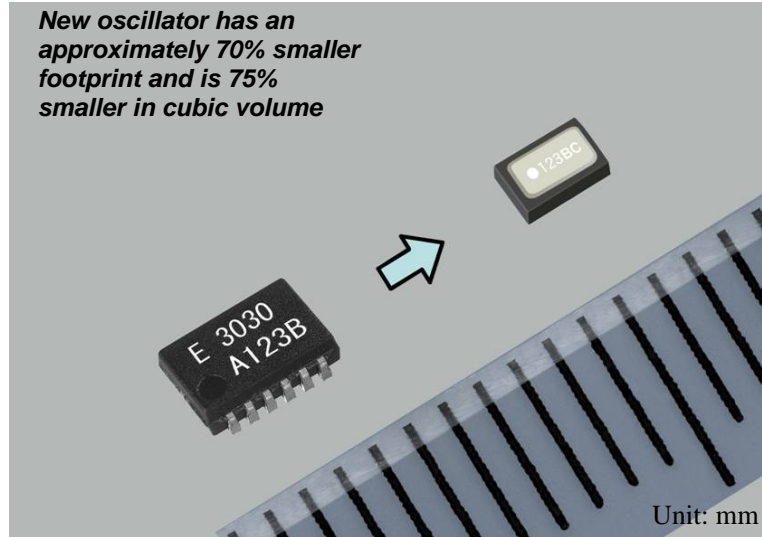
The SG-3050BC also outperforms the previous SG-3030 series, boasting an operating voltage range of 1.2 to 5.5 V and initial frequency tolerance of  $5.0 \pm 5.0 \times 10^{-6}$ .

Epson Toyocom's SG-3050BC is a total solution that will help customers add value to their systems by allowing them to use space more efficiently in feature-rich electronic equipment.

\* Smallest Crystal Oscillator with integrated 32.678-kHz crystal unit as of March 17, 2009. Based on

Epson Toyocom research.

Size comparison between the newly developed SG-3050BC and the conventional SG-3030LC



Right: Newly developed SG-3050BC (2.2 × 1.4 × 1.0t mm)  
Left: Conventional SG-3030LC (3.6 × 2.8 × 1.2t mm)

#### Main Specifications

Item	SG-3050BC
Max. external dimensions	2.2 x 1.4 x 1.0t mm (SON-6 pin)
Supply voltage	1.2 V to 5.5 V
Operating temperature range	-40 °C to +85 °C
Current consumption	2.0 μA (Max) / 3 V
Frequency tolerance	AA accuracy: $5.0 \pm 5.0 \times 10^{-6}$ Max. B accuracy: $5.0 \pm 23.0 \times 10^{-6}$ Max.

## Glossary

### (\*1) 32.768 kHz crystal oscillator

A product that integrates an oscillation circuit and a 32.768 kHz crystal unit in a single package. 32.768 kHz crystal oscillators not only benefit users by eliminating the need to design oscillation circuits and regulate frequency stability, they also offer more efficient use of the limited space available on circuit board.

### (\*2) QMEMS

QMEMS is a combination of "Quartz," a crystalline material with excellent characteristics such as high stability and high accuracy, and "MEMS" (micro electro mechanical system). QMEMS quartz devices are created using quartz material instead of the semiconductors used by MEMS. We perform precision microfabrication on the quartz material to offer high performance in a compact package. QMEMS is a registered trademark of Epson Toyocom.

### (\*3) NPO (New Platform Oscillator) Structure

An oscillator that combines a ceramic packaged crystal unit and an oscillator circuit in a plastic mold. Better heat stress absorption and vibration resistance give the NPO structure higher throughput in batch processing than ceramic packages.

## About Epson

Epson is a global leader in imaging products including printers, 3LCD projectors and small- and medium-sized LCDs. With an innovative and creative culture, Epson is dedicated to exceeding the vision and expectations of customers worldwide with products known for their superior quality, functionality, compactness and energy efficiency.

Epson is a network of 88,925 employees in 109 companies around the world, and is proud of its ongoing contributions to the global environment and to the communities in which it is located. Led by the Japan-based Seiko Epson Corp., the Group had consolidated sales of 1,347 billion yen in fiscal 2007.

## About Epson Europe Electronics GmbH

Epson Europe Electronics GmbH is a marketing, engineering and sales company and the European Headquarters for Electronic Devices of the Seiko Epson Corp., Epson Imaging Devices Corp. and Epson Toyocom Corp., Japan.

Headquartered in Munich/Germany, Epson Europe Electronics GmbH has several European sales representatives and has a European-wide network of distributors. We provide value added services for Semiconductors, Displays and Quartz Devices targeted to the mobile communication, automotive and home visual market. Epson products are recognised for energy saving, low power, small form factors and rapid time to market.

Information about Epson Europe Electronics GmbH is available in the Internet under [www.epson-electronics.de](http://www.epson-electronics.de).

## About Epson Toyocom Corporation

Epson Toyocom Corporation was formed through the integration of the quartz business of Seiko Epson Corporation and Toyo Communication Equipment Co., Ltd. in October 2005. Epson Toyocom follows a "3D strategy" designed to drive both horizontal growth through expansion in three device categories—timing devices, sensing devices and optical devices—and vertical growth through combinations of products in these categories. With this strategy, Epson Toyocom aims to be the leading company in the quartz device industry, selling a wide range of products to customers worldwide, from cellular phones for consumer fields, to industrial fields such as core network systems and automotive systems. Epson Toyocom has eight production sites and more than 7,000 employees worldwide.

Information about Epson Toyocom is available in the Internet under [www.epsontoyocom.co.jp/english](http://www.epsontoyocom.co.jp/english).

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**Further information**

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