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**Epson Toyocom Develops GHz-Band, High-Stability SAW Oscillators
with Low Phase Noise and Low Jitter**

Epson Toyocom Corporation, the leader in crystal devices, has developed two new models of low phase-noise, low-jitter SAW oscillators (*1) that output GHz band (800 MHz – 2.5 GHz) frequencies at the fundamental. Commercial development is scheduled for the first half of fiscal 2009.

The newly developed oscillators are the single-output EG-9000GC and the voltage-controlled EV-9000GB. The low phase noise ^(*2), low jitter ^(*3) and excellent frequency-temperature coefficient characteristics of these oscillators is achieved by the built-in NS-34R crystal oscillating element. The NS-34R boasts a high Q value ^(*4), low insertion loss, high power durability, and an outstanding frequency-temperature coefficient, in addition to Epson Toyocom's unique high-frequency circuit technology.

Phase noise is mitigated in the low offset frequency range (roughly 500 kHz up to 1.5 MHz) by taking advantage of the high Q value of the NS-34R. Phase noise is mitigated in the high offset frequency range (from roughly 500 kHz to 1.5 MHz or more) by taking advantage of the NS-34R's high-power durability characteristics to raise the level of signals in the oscillation loop. The oscillators boast an extremely stable frequency-temperature coefficient that is 1/5 that of a conventional dielectric resonator oscillator and 1/3 that of an oscillator employing an STW ^(*5) crystal.

The EG9000GC and EV-9000GB will help provide performance gains in applications that require high frequencies and a highly stable clock (one with low phase noise, low jitter, and an excellent frequency-temperature coefficient). Communications and measurement applications will be particular beneficiaries. These oscillators are expected to contribute to the discovery of new technologies and the development of new products in applied microwave technology markets.

Main Features

1. Support fundamental frequencies from 800 MHz to 2.5 GHz
2. Low phase noise and low jitter due to a newly developed SAW resonator that provides both a high Q value and high power durability
3. Highly stable oscillations due to the new resonator's superior frequency-temperature coefficient
4. Low power design (3V and 35 mA)

Main specifications

	EG-9000GC	EV-9000GB (voltage-controlled model)
Frequency tolerance	$\pm 150 \times 10^{-6}$ Max.	
Frequency control range	-	TBD
Operating temperature range	-20 to +60 °C	
Output frequency range	800 MHz to 2.5 GHz	
Power supply voltage	3.0 V	
Current consumption	38 mA Max.	
Output waveform	Sine wave	
External dimensions	10.0 x 10.0 x 2.8t mm Typ.	14.0 x 9.0 x 2.8t mm Typ.

Glossary

*1 SAW oscillator

An oscillator equipped with a crystal unit that uses surface acoustic waves. SAW oscillators provide low phase noise and low jitter due to their ability to oscillate at a high fundamental frequency. Epson Toyocom first commercialized SAW resonators in 1997 and has offered them ever since. Furthermore, since 2002, the company has offered products that feature superior frequency-temperature characteristics, with a second-order temperature coefficient less than half that of typical SAW resonators (ST cut), through application of original technology.

*2 Phase noise

Useless energy that is radiated near the oscillation frequency, and that occurs due to the internal and external environmental factors (noise) of a crystal oscillation circuit. Wireless signal transmission errors can occur when this noise value is too high.

*3 Jitter

Fluctuation among clock cycles, which can cause jittery images or bit errors during data transfers.

*4 Q value

Q is a dimensionless number that primarily indicates the state of oscillation. In the propagation of elastic (acoustic) waves, the value relates to loss of energy due to absorption by a medium. In oscillation, it is the energy stored in a system divided by the energy dissipated from the system over the course of one period, where a larger value indicates greater oscillation stability.

*5 STW

An STW (surface transverse wave) is 1.6 times faster than a ST-cut crystal SAW. However, its frequency-temperature characteristics are slightly inferior to those of an ST-cut crystal.