

April 22, 2008

<p>Epson Toyocom Bolsters its Lineup of Compact, Stable, High-Frequency HFF Crystal Oscillators for Telecommunications Networks</p>
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Epson Toyocom Corporation (“Epson Toyocom”), the leader in crystal devices, has announced the commercial development of two new models of highly accurate, miniature, high-frequency fundamental mode (HFF) crystal oscillators for high-frequency applications in optical transmission devices, cellular base stations, WiMAX base stations and other core network equipment. The new HFF crystal oscillators, the VG-4511CA and the SG-771PCD series, will enter volume production in April 2008.

Communications network equipment providers require increasingly demanding performance from frequency-stable, high-frequency crystal oscillators in order to assure communications reliability and to support higher bandwidths and transmission speeds, even as the need for smaller, space-saving devices accelerates.

Epson Toyocom has been using QMEMS^(*1) fabrication technology to provide HFF crystal oscillators having a crystal unit with a proprietary inverted-mesa structure. This structure, wherein only a portion of the resonator near an excitation electrode is thinned, enables higher stability and higher frequency. In addition to offering enhanced performance, the new HFF crystal oscillators were made a compact 7.0 x 5.0 x 1.6t mm by adopting a single-sealed structure^(*3) instead of the conventional double-sealed structure. Meanwhile, ageing characteristics were improved by using wire bonding to bond the crystal chip and package.

To meet market needs for a wider selection of devices for a wider range of transmission equipment and base station specifications, Epson Toyocom is beefing up its lineup with the SG-771PCD crystal oscillators and the VG-4511CA series of frequency-adjustable voltage-controlled crystal oscillators (VCXOs).

The next-generation network^(*4) market is expected to further expand, and Epson Toyocom plans to meet the needs of this market by leveraging its QMEMS fabrication and other technologies to continue developing and commercializing space-saving, high-frequency crystal devices that offer precision and stability advantages.

Main Features

- Supports frequencies up to 170 MHz
- Low-phase noise^(*5) and low jitter^(*6) at the crystal's fundamental oscillation frequency
- Superior ageing and humidity-resistance characteristics
- Small package dimensions of just 7.0 x 5.0 x 1.6t mm

Main Specifications

	VG-4511CA Specifications
Frequency tolerance / Operating temperature	$\pm 50 \times 10^{-6}$ Max. -40°C to +85°C
Output frequency range	80 MHz to 170MHz
Supply voltage	3.3V ± 0.165 V
Current consumption	70 mA Max.
Output	LV-PECL
Absolute pull range	$\pm 50 \times 10^{-6}$ Min.
External dimensions	7.0×5.0×1.6t mm

	SG-771PCD Series Specification			
	A	B	C	D
Frequency tolerance / Operating temperature	$\pm 30 \times 10^{-6}$ Max. -40°C to +85°C	$\pm 35 \times 10^{-6}$ Max. -40°C to + 85°C	$\pm 20 \times 10^{-6}$ Max. -10°C to + 70°C	$\pm 25 \times 10^{-6}$ Max. -10°C to + 70°C
Output frequency range	80 MHz to 175 MHz			
Supply voltage	3.3V ± 0.165 V			
Current consumption	70 mA Max.			
Output	LV-PECL			
External dimensions	7.0×5.0×1.6t mm			

Glossaries

(*1) QMEMS

QMEMS is a combination of “Quartz,” a crystalline material with excellent characteristics such as high stability and high precision, 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.

(*2) HFF (High Frequency Fundamental)

The thinner the crystal chip in a crystal device, the higher the frequency at which the device is capable of oscillating. "HFF" refers to an AT-cut crystal unit or oscillator that is capable of oscillating at fundamental frequencies as high as 170 MHz. These high frequencies are produced by a thin yet robust crystal chip fabricated using QMEMS technology so that they have an inverse-mesa structure, wherein only an excitation component is thinned.

Since the fundamental oscillates at high frequency, HFF devices exhibit higher stability than devices that achieve high frequencies at overtones.

HFF is a registered trademark of Epson Toyocom.

(*3) Double-sealed structure and single-sealed structure

A double-sealed structure consists of a packaged crystal unit and a packaged oscillation circuit that are enclosed together in another package. In contrast, a single-sealed structure encloses the crystal chip and oscillation circuit in a single package. The single-sealed structure is advantageous in terms of saving space.

(*4) Next-generation networks (NGN)

NGN, networks of the future that are being built out primarily by Japanese and European telecommunications providers, are able to provide a variety of services, such as voice, data, TV telephony and video, over IP. Groups such as ITU-T (International Telecommunications Union Telecommunications Standardization Sector) are developing standards for NGNs.

(*5) Phase noise

This refers to 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.

(*6) Jitter

This refers to fluctuation among clock cycles, which can cause jittery images or bit errors during data transfers.