



October 29th, 2020
Nihon Dempa Kogyo Co., Ltd.
Representative Director and President
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Development of the world's smallest 7×5mm-sized OCXO capable of handling high temperatures (+95°C) for 5G base stations

Nihon Dempa Kogyo Co., Ltd. has developed the world's smallest-class ^(*1) 7×5mm-sized OCXO (quartz oscillator with a temperature chamber) for 5G small base stations with an operation upper limit temperature up to +95°C, and has begun sample shipment since October.

In order to achieve high-speed, high-capacity communication and ultra-low latency communication with the spread of 5G and local 5G, the system covers the area by installing a large number of small base stations. These small base stations will be installed on the top of outdoor steel poles, rooftops, walls, and other narrow spaces, and the environment of the installation site will be exposed to direct sunlight, wind, and rain, making them more stringent than before.

Since the internal components of miniaturized base station equipment are affected by internal temperature rise due to high-density mounting and external environmental changes of high temperature and humidity, a compact high-stability crystal oscillator with stable operation at high temperatures, good temperature slope characteristics ^(*2) with good phase noise characteristics is required.

To meet these demands, we have achieved miniaturization by developing a dedicated ASIC ^(*3) that contains all of the oscillator circuits, temperature-control circuits, and other components of OCXO on a single chip.

In addition, by leveraging the strengths of integrated manufacturing from the growth of quartz crystal to the manufacturing of crystal oscillators, we have developed a small SC-cut oscillator using high-Q crystal quartz ^(*4) to achieve the high stability and low noise required by 5G systems. Furthermore, the temperature slope characteristics achieves a value of $\pm 0.1 \times 10^{-9}/^{\circ}\text{C}$, which is 1/200 compared to the conventional high-precision TCXO.

Also, the adaptation of airtight packages in which humidity and dust do not enter has enhanced reliability.

The newly developed product was presented at IFCS2020(International Frequency Control Symposium) conference held from July 19 to 23 of this year.

We will continue to contribute to the realization of a safe, secure and comfortable society through our quartz device and crystal application equipment businesses.

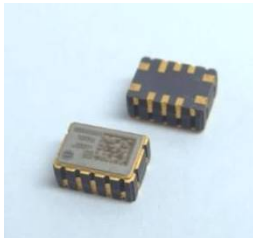
- (*1) October 2020, our survey
- (*2) Indicates the temperature characteristics of the crystal oscillator with respect to the temperature change, and the smaller the value, the smaller the frequency change with respect to the change of the ambient temperature.
- (*3) Abbreviation of Application Specific Integrated Circuit: In order to realize this OCXO, we have developed a new type of oscillator circuit and a temperature-control circuit to maximize the performance of the crystal oscillator
- (*4) Synthetic crystal quartz for high stability with very low impurities and low distortion caused by hysteresis of temperature changes

[Sample and mass production]

Sample shipments started in October 2020, mass production scheduled for June 2021

[Model name] NH7050SA

[Product Appearance]

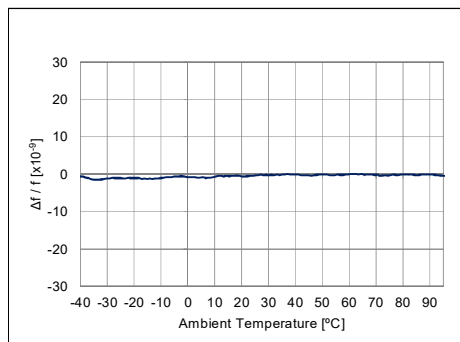


[Product characteristics]

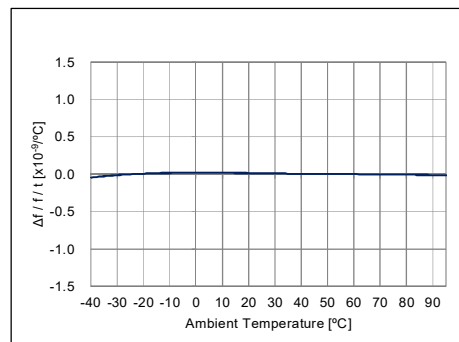
Dimensions	7.0 x 5.0 x 3.3mm
Nominal Frequency Range	10MHz to 50MHz
Standard Frequency	20M, 30.72M, 38.88M, 48MHz
Output	LVC MOS
Supply Voltage [V _{cc}]	DC+3.3 V
Power Consumption (when stable)	Max. 0.6 W
Operating Temperature Range	-40 °C to +95 °C
Frequency / Temperature Slope Characteristics	Typ. +/- 0.1 x 10 ⁻⁹ /°C
Frequency/Temperature Characteristics	Max. +/- 20 x 10 ⁻⁹

[Characteristic example]

■ Frequency / Temperature Characteristics



■ Frequency / Temperature Slope Characteristics



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