

April 19, 2019
Nihon Dempa Kogyo Co., Ltd.
Representative Director and President
Hiromi Katoh

**Development of temperature-compensated crystal oscillator
with the industry's highest ^{(*)1} low-phase noise characteristic**

Nihon Dempa Kogyo Co., Ltd. has developed a TCXO (temperature-compensated crystal oscillator) that is 2.0 x 1.6 x 0.7mm in size that achieves the industry's highest level of low-phase noise of -170dBc/ Hz@100kHz offset^{(*)2}. Sample shipments will begin in July 2019.

In order to improve communication quality with multi-level modulation and larger capacity such as 5G and other high-speed mobile communication Wi-Fi 6 (IEEE802.11ax) and SONET/SDH (Synchronous Optical Network/Synchronous Digital Hierarchy), and it is expected that the demand for TCXO with low-phase noise characteristics will increase in the future.

It is important to select and design an oscillator because the modulation accuracy (signal phase and amplitude deviation) in communication equipment is largely affected by the phase noise of the reference signal source used in the equipment.

Also, phase noise is closely related to the RMS phase jitter ^{(*)3}, so selecting an oscillator with excellent phase noise contributes to the improvement of the phase jitter.

In response to these demands, we have optimized the design of quartz resonators using synthetic quartz with a high Q ^{(*)4} value grown by our high technology, and developed a temperature compensated quartz oscillator with the industry's highest low phase noise characteristics by reducing the noise of the oscillation circuits.

- **Floor noise-170dBc/Hz @100kHz offset ^{(*)2}**
(reduced by-17dBc/Hz compared to the previous model)
- **Phase jitter: 110fs @12kHz to 5 MHz**
(71% reduction compared to conventional jitter)

Based on this technology, we plan to expand our product lineup to other sizes.

This product will be presented at Wireless Technology Park 2019, which will be held at Tokyo-Big Sight from Wednesday, May 29 to Friday, May 31. (NDK Booth: West 3 Hall 1931)

(*1) Our survey in March 2019

(*2) Oscillation frequency: 26 MHz, temperature: +25 deg C

(*3) Deviation or fluctuation in the time axis that occurs in the waveform when transmitting a digital signal.

(*4) In a quartz oscillator, it indicates the degree of resonance sharpness, and the larger (higher) this value means the oscillation is more stable.

[Appearance of the product]



[Sample/Mass Production]

Sample shipments are scheduled to start in July 2019 and mass production is scheduled to start in January 2020.

[Specification characteristics]

Model Name	NT2016SJA
External Size	2.0 x 1.6 x 0.7 mm

Electrical Characteristics

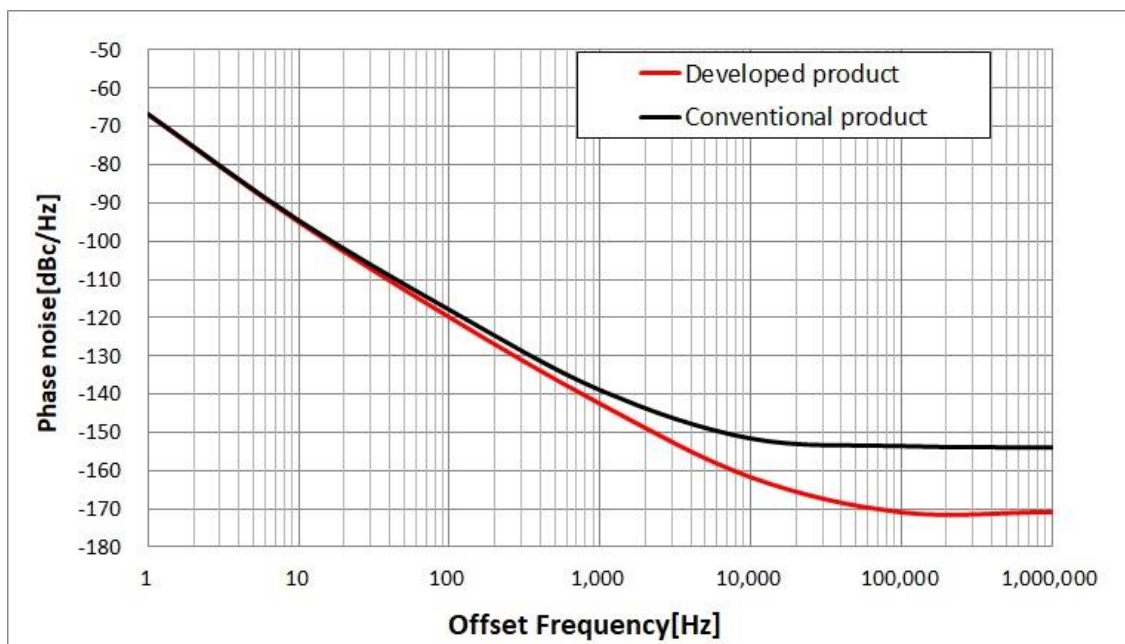
Nominal Frequency	13 MHz to 52 MHz
Standard Frequency	26MHz, 52MHz
Power Supply Voltage (V _{CC})	+ 1.8 V +/- 5% ^(Note 1)
Load Impedance	10kΩ//10pF
Operating Temperature Range	-30 to +85 deg C
Current Consumption	Max. 2.5mA /26MHz (Enable)
	Max. 4uA /26MHz (Disable)
Output Voltage	Min. 0.8 V (p-p) (DC Coupling ^(Note 2))
Frequency/Temperature Characteristics	Max. +/- 0.5 x 10 ⁻⁶
Long-term Frequency Stability	Max. +/- 1.0 x 10 ⁻⁶ /year (at +25deg C)

(Note 1) DC+1.7 V to +3.3 V can be used.

(Note 2) The DC cut capacitor is not built in. Connect the capacitor (1,000 pF) in series with the oscillator output line.

[Example of Phase Noise Characteristics]

Conditions: nominal frequency 26 MHz, temperature +25 deg C



For more information on the product, please contact:

[Contact Info]

e-Mail : ndkpr-m@ndk.com