NDK

Crystal Bridge to the Future

Issued 2016

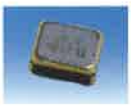
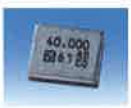
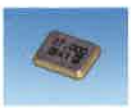
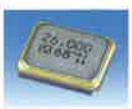
CRYSTAL PRODUCTS

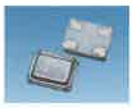
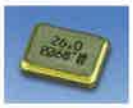
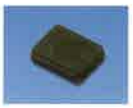
- CRYSTAL UNITS
- CRYSTAL CLOCK OSCILLATORS
- CRYSTAL OSCILLATORS
- CRYSTAL FILTERS
- SAW DEVICES
- FREQUENCY SYNTHESIZERS
- OPTICAL COMPONENTS
- ULTRASONIC PROBES (TRANSDUCERS)
- BIOSENSORS

NIHON DEMPA KOGYO CO.,LTD.

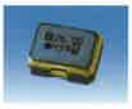
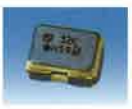
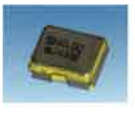
This catalog shows products and specifications of our main range.
Please contact our sales representatives or visit our website (http : //www.ndk.com/) with your inquires.

Crystal Unit

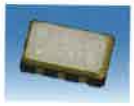
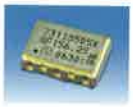
NX1610SA NEW (1.6×1.0×0.45mm) RoHS Pb Free		**Tuning fork crystal unit (kHz range)** Nominal Frequency : 32.768kHz Frequency Tolerance : ±20×10^{-6} Operating Temperature Range : -40 to +85°C
NX2012SA (2.0×1.2×0.55mm) RoHS Pb Free		**Tuning fork crystal unit (kHz range)** Nominal Frequency : 32.768kHz Frequency Tolerance : ±20×10^{-6} Operating Temperature Range : -40 to +85°C
NX3215SA (3.2×1.5×0.8mm) RoHS Pb Free		**Tuning fork crystal unit (kHz range)** Nominal Frequency : 32.768kHz Frequency Tolerance : ±20×10^{-6} Operating Temperature Range : -40 to +85°C
NX3215SA (3.2×1.5×0.8mm) RoHS Pb Free		**Tuning fork crystal unit (kHz range) for automotive** Nominal Frequency : 32.768kHz Frequency Tolerance : ±20×10^{-6} Operating Temperature Range : -40 to +125°C Conforms to AEC-Q200
NX1612SB NEW (1.6×1.2×0.45mm) RoHS Pb Free		**Crystal Unit with built-in thermistor** Nominal Frequency Range : 26 to 52MHz Frequency Tolerance : ±10×10^{-6} Frequency / Temperature Characteristics : ±12×10^{-6} Operating Temperature Range : -30 to +85°C
NX2016SF (2.0×1.6×0.65mm) RoHS Pb Free		**Crystal Unit with built-in thermistor** Nominal Frequency Range : 19.2 to 52MHz Frequency Tolerance : ±10×10^{-6} Frequency / Temperature Characteristics : ±12×10^{-6} Operating Temperature Range : -30 to +85°C
NX2520SG (2.5×2.0×0.9mm) RoHS Pb Free		**Crystal Unit with built-in thermistor for automotive** Nominal Frequency Range : 16 to 80MHz Frequency Tolerance : ±10×10^{-6} Frequency / Temperature Characteristics : ±25×10^{-6} Operating Temperature Range : -40 to +105°C Conforms to AEC-Q200
NX1210AB NEW (1.2×1.0×0.3mm) RoHS Pb Free		**Ultra compact size crystal unit (1.2×1.0mm)** Nominal Frequency Range : 26 to 52MHz Frequency Tolerance : ±10×10^{-6} Frequency / Temperature Characteristics : ±15×10^{-6} Operating Temperature Range : -30 to +85°C
NX1612SA (1.6×1.2×0.3mm) RoHS Pb Free		**Ultra compact size crystal unit (1.6×1.2mm)** Nominal Frequency Range : 24 to 80MHz Frequency Tolerance : ±10×10^{-6} Frequency / Temperature Characteristics : ±15×10^{-6} Operating Temperature Range : -30 to +85°C
NX2016HA (2.0×1.6×0.7mm) RoHS Pb Free		**For reference clock of TV set, tablet PC, and other equipment** Nominal Frequency Range : 24 to 50MHz Frequency Tolerance : ±30×10^{-6} Frequency / Temperature Characteristics : ±20×10^{-6} Operating Temperature Range : -20 to +70°C
NX2016SA (2.0×1.6×0.45mm) RoHS Pb Free		**Compact size crystal unit (2.0×1.6mm)** Nominal Frequency Range : 16 to 80MHz Frequency Tolerance : ±15×10^{-6} Frequency / Temperature Characteristics : ±25×10^{-6} Operating Temperature Range : -40 to +85°C
NX2016SA (2.0×1.6×0.45mm) RoHS Pb Free		**Compact size crystal unit (2.0×1.6mm) for automotive** Nominal Frequency Range : 20 to 80MHz Frequency Tolerance : ±15×10^{-6} Frequency / Temperature Characteristics : ±50×10^{-6} Operating Temperature Range : -40 to +125°C Conforms to AEC-Q200
NX2016GB NEW (2.0×1.6×0.8mm) RoHS		**Compact size crystal unit (2.0×1.6mm) for automotive** Nominal Frequency Range : 16 to 50MHz Frequency Tolerance : ±50×10^{-6} Frequency / Temperature Characteristics : ±150×10^{-6} Operating Temperature Range : -40 to +150°C Conforms to AEC-Q200
NX2520SA (2.5×2.0×0.5mm) RoHS Pb Free		**For reference clock of smartphone, tablet PC, and other equipment** Nominal Frequency Range : 16 to 80MHz Frequency Tolerance : ±15×10^{-6} Frequency / Temperature Characteristics : ±25×10^{-6} Operating Temperature Range : -40 to +85°C

NX3225HA (3.2×2.5×0.8mm) RoHS Pb Free		**For reference clock of TV set, tablet PC, and other equipment** Nominal Frequency Range : 12 to 50MHz Frequency Tolerance : ±20×10^{-6} Frequency / Temperature Characteristics : ±30×10^{-6} Operating Temperature Range : -20 to +70°C
NX3225SA (3.2×2.5×0.55mm) RoHS Pb Free		**Compact size crystal unit (3.2×2.5mm) for automotive** Nominal Frequency Range : 12 to 50MHz Frequency Tolerance : ±15×10^{-6} Frequency / Temperature Characteristics : ±50×10^{-6} Operating Temperature Range : -40 to +125°C Conforms to AEC-Q200
NX3225SC (3.2×2.5×0.6mm) RoHS Pb Free		**Ideal for the special requirements of automotive, such as TPMS** Nominal Frequency Range : 9.8433 to 50MHz Frequency Tolerance : ±15×10^{-6} Frequency / Temperature Characteristics : ±50×10^{-6} Operating Temperature Range : -40 to +125°C Conforms to AEC-Q200
NX3225GA (3.2×2.5×0.75mm) RoHS		**Crystal unit for automotive (Excellent environment-resistant performance)** Nominal Frequency Range : 9.8 to 50MHz Frequency Tolerance : ±50×10^{-6} Frequency / Temperature Characteristics : ±150×10^{-6} Operating Temperature Range : -40 to +150°C Conforms to AEC-Q200
NX3225GB (3.2×2.5×0.75mm) RoHS		**Crystal unit for automotive (High resistance to solder cracking)** Nominal Frequency Range : 12 to 50MHz Frequency Tolerance : ±50×10^{-6} Frequency / Temperature Characteristics : ±150×10^{-6} Operating Temperature Range : -40 to +150°C Conforms to AEC-Q200

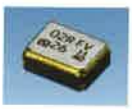
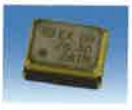
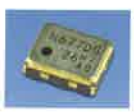
Crystal Clock Oscillator

NZ2016SH (2.0×1.6×0.7mm) RoHS Pb Free		**Supports a wide temperature range from -40 to +125°C / MHz** Nominal Frequency Range : 1.5 to 80MHz Output level : CMOS Supply Voltage [V_{CC}] : +1.8V, +2.5V, +3.0V, +3.3V Operating Temperature Range : -40 to +125°C Overall Frequency Tolerance : ±100×10^{-6} Conforms to AEC-Q200
NZ2016SH (2.0×1.6×0.7mm) RoHS Pb Free		**Supports a wide temperature range from -40 to +125°C / kHz** Nominal Frequency : 32.768kHz Output level : CMOS Supply Voltage [V_{CC}] : +1.8V, +2.5V, +3.0V, +3.3V Operating Temperature Range : -40 to +125°C Overall Frequency Tolerance : ±100×10^{-6}
NZ2520SH NEW (2.5×2.0×0.9mm) RoHS Pb Free		**Supports a wide temperature range from -40 to +125°C / MHz** Nominal Frequency Range : 1.5 to 80MHz Output level : CMOS Supply Voltage [V_{CC}] : +1.8V, +2.5V, +3.0V, +3.3V Operating Temperature Range : -40 to +125°C Overall Frequency Tolerance : ±100×10^{-6} Conforms to AEC-Q100/200
NZ2016SD (2.0×1.6×0.7mm) RoHS Pb Free		**Low phase noise type which is ideal for high-quality-audio, wireless LAN** Nominal Frequency Range : 1.5 to 60MHz Output Level : CMOS Phase Noise (26MHz) : Typ. -157dBc / Hz at 100kHz Supply Voltage [V_{CC}] : +1.8V, +2.5V, +3.0V, +3.3V Operating Temperature Range : -10 to +60°C Overall Frequency Tolerance : ±20×10^{-6}
NZ2520SEA (2.5×2.0×0.9mm) RoHS Pb Free		**High precision clock oscillator for wireless communication devices.** Nominal Frequency Range : 2.75 to 54MHz Output Level : CMOS Supply Voltage [V_{CC}] : +1.8V, +2.5V, +3.0V, +3.3V Operating Temperature Range : -40 to +85°C Overall Frequency Tolerance : ±15×10^{-6}
NZ2016SF (2.0×1.6×0.7mm) RoHS Pb Free		**Ultra low power-driven, ideal for mobile devices** Nominal Frequency Range : 1.5 to 50MHz Output Level : CMOS Supply Voltage [V_{CC}] : +0.9V, +1.2V, +1.5V Operating Temperature Range : -10 to +70°C Overall Frequency Tolerance : ±30×10^{-6}
NZ2016SJ (2.0×1.6×0.7mm) RoHS Pb Free		**Low current consumption crystal clock oscillator** Nominal Frequency Range : 6 to 40MHz Output Level : CMOS Current Consumption (No-Load) : Max. 0.7mA Supply Voltage [V_{CC}] : +1.8V Operating Temperature Range : -40 to +85°C Overall Frequency Tolerance : ±30×10^{-6}

Simple Packaged Crystal Oscillator (SPXO)

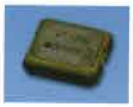
NP5032SB (5.0×3.2×1.2mm) RoHS Pb Free		**For SONET-, SDH-, and GbEthernet-related equipment** Nominal Frequency Range : 100 to 161MHz Outpu Level : LVDS Supply Voltage [V_{cc}] : +2.5V, +3.3V Operating Temperature Range : 0 to +70°C Overall Frequency Tolerance : ±25×10^{-6} Phase Jitter : Max. 1ps (Offset Frequency : 12kHz to 20MHz)
7311S-DF (7.0×5.0×1.7mm) RoHS Pb Free		**For SONET-, SDH-, and GbEthernet-related equipment** Nominal Frequency Range : 62.5 to 220MHz Outpu Level : LVPECL Supply Voltage [V_{cc}] : +3.3V Operating Temperature Range : -40 to +85°C Frequency Tolerance : ±50×10^{-6} Phase Jitter : Max. 1ps (Offset Frequency : 12 kHz to 20 MHz)

Temperature Compensated Crystal Oscillator (TCXO)

NT2016SE NEW (2.0×1.6×0.8mm) RoHS Pb Free		**Supports a widetemperature range from -40 to +105°C** Nominal Frequency Range : 10 to 52MHz Supply Voltage [V_{cc}] : +1.8V Frequency / Temperature Characteristics : Max. ±0.5×10^{-6} Operating Temperature Range : -40 to +105°C Conforms to AEC-Q100/200
NT2520SE NEW (2.5×2.0×0.9mm) RoHS Pb Free		**Supports a widetemperature range from -40 to +105°C** Nominal Frequency Range : 10 to 52MHz Supply Voltage [V_{cc}] : +1.8V Frequency / Temperature Characteristics : Max. ±0.5×10^{-6} Operating Temperature Range : -40 to +105°C Conforms to AEC-Q100/200
NT2016SC (2.0×1.6×0.8mm) RoHS Pb Free		**With two outputs of same frequency** Nominal Frequency Range : 10 to 52MHz Supply Voltage [V_{cc}] : +1.8V Frequency / Temperature Characteristics : Max. ±2.0×10^{-6} Operating Temperature Range : -30 to +85°C
NT2016SB NEW (2.0×1.6×0.8mm) RoHS Pb Free		**Supports low power supply voltage (Supports DC +1.1V to +1.4V)** Nominal Frequency Range : 10 to 40MHz Supply Voltage [V_{cc}] : +1.2V Frequency / Temperature Characteristics : Max. ±0.5×10^{-6} Operating Temperature Range : -30 to +85°C
NT2520SC (2.0×1.6×0.9mm) RoHS Pb Free		**CMOS Output. Small size TCXO** Nominal Frequency Range : 19 to 52MHz Supply Voltage [V_{cc}] : +1.8V, +3.3V Frequency / Temperature Characteristics : Max. ±2.5×10^{-6} Operating Temperature Range : -30 to +85°C
NT1612AA NEW (1.6×1.2×0.55mm) RoHS Pb Free		**VC-TCXO with AFC Function** Nominal Frequency Range : 26 to 52MHz Supply Voltage [V_{cc}] : +1.8V Frequency / Temperature Characteristics : Max. ±2.0×10^{-6} Operating Temperature Range : -30 to +85°C
NT1612AA NEW (1.6×1.2×0.55mm) RoHS Pb Free		**TCXO for high-precision GPS** Nominal Frequency Range : 26 to 52MHz Supply Voltage [V_{cc}] : +1.8V Frequency / Temperature Characteristics : Max. ±0.5×10^{-6} Operating Temperature Range : -30 to +85°C
NT1612AB NEW (1.6×1.2×0.55mm) RoHS Pb Free		**Ultra compact size TCXO (with Enable/Disable function) for high-precision GPS** Nominal Frequency Range : 26 to 52MHz Supply Voltage [V_{cc}] : +1.8V Frequency / Temperature Characteristics : Max. ±0.5×10^{-6} Operating Temperature Range : -30 to +85°C
NT2520SD NEW (2.5×2.0×0.9mm) RoHS Pb Free		**Compact size TCXO (with Enable/Disable function) for high-precision GPS** Nominal Frequency Range : 10 to 52MHz Supply Voltage [V_{cc}] : +1.8V Frequency / Temperature Characteristics : Max. ±0.5×10^{-6} Operating Temperature Range : -30 to +85°C Conforms to AEC-Q100/200
NT3225SA (3.2×2.5×1.0mm) RoHS Pb Free		**TCXO for high-precision GPS** Nominal Frequency Range : 10 to 40MHz Supply Voltage [V_{cc}] : +1.8V, +2.8V Frequency / Temperature Characteristics : Max. ±0.5×10^{-6} Operating Temperature Range : -30 to +85°C Conforms to AEC-Q200
NT7050BB/BC (7.0×5.0×2.0mm) RoHS Pb Free		**High Precision TCXO for Stratum 3** Nominal Frequency Range : 10 to 25MHz Supply Voltage [V_{cc}] : +3.3V Frequency / Temperature Characteristics : Max. ±0.5×10^{-6} Operating Temperature Range : -40 to +105°C Current Consumption : Max. 6mA NT7050BC With Enable / Disable (Stand-by) function

Voltage Controlled Crystal Oscillator (VCXO)

NV2520SA
(2.5×2.0×0.9mm)
RoHS Pb Free



Small size VCXO (2.5×2.0mm)
Nominal Frequency Range : 1.25 to 80MHz
Phase Noise (25MHz) : Typ. -154dBc / Hz at 100kHz
Operating Temperature Range : -40 to +85°C
Overall Frequency Tolerance : Max. ±50×10^{-6}

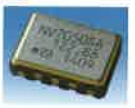
NV5032SA
(5.0×3.2×1.2mm)
RoHS Pb Free

For communication equipment
Nominal Frequency Range : 62 to 170MHz
Output Level : CMOS
Supply Voltage [V_{cc}] : +3.3V
Operating Temperature Range : -40 to +85°C
Overall Frequency Tolerance : Max. ±50×10^{-6}
Frequency Control Range / Control Voltage : Min. ±100×10^{-6} / +1.65±1.65V

NV5032SC
(5.0×3.2×1.2mm)
RoHS Pb Free

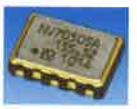
For base stations and optical network devices
Nominal Frequency Range : 100 to 200MHz
Supply Voltage [V_{cc}] : +3.3V
Operating Temperature Range : -40 to +85°C
Phase Noise (122.88MHz) : -127dBc / Hz at 1kHz, -156dBc / Hz at 100kHz
Phase Jitter (RMS) : Max. 1ps (Typ. 0.13ps) / 12kHz to 20MHz

NV7050SA NEW
(7.0×5.0×1.6mm)
RoHS Pb Free



Supports a wide temperature range from –40 to +105°C
For SONET-, SDH-, and GbEthernet-related equipment
Nominal Frequency : 122.88MHz
Supply Voltage [V_{cc}] : +3.3V
Operating Temperature Range : -40 to +105°C
Overall Frequency Tolerance : ±50×10^{-6}

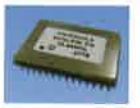
NV7050SA
(7.0×5.0×1.6mm)
RoHS Pb Free



For SONET-, SDH-, and GbEthernet-related equipment
Nominal Frequency Range : 80 to 170MHz
Supply Voltage [V_{cc}] : +3.3V
Operating Temperature Range : -40 to +85°C
Overall Frequency Tolerance : Max. ±50×10^{-6}
Frequency Control Range / Control Voltage : Min. ±100×10^{-6} / +1.65±1.65V

Frequency Controlled Crystal Oscillator (FCXO)

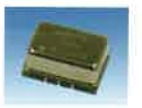
NW36M25LA
(36.83×25.4×6.0mm)
RoHS



Four inputs, Stratum 3 solution for the Synchronous Timing Source in SONET / SDH network elements.
Supply Voltage [V_{cc}] : +3.3V
Operating Temperature Range : 0 to +70°C
Input Level / Output Level : CMOS
Input Reference Frequency : Accepts 4 reference inputs from 0.008, 1.544, 2.048, 12.96, 19.44, 25.92, 38.88, 51.84, and 77.76MHz
Output Frequency : One selectable from 12.96, 19.44, 25.92, 38.88, 51.84, and 77.76MHz
Free-run Accuracy : Max. ±4.6×10^{-6}

Oven Controlled Crystal Oscillator (OCXO)

NH14M09TA
(14.3×9.4×6.5mm)
RoHS Pb Free



High precision small size crystal oscillator (Twin-OCXO)
Nominal Frequency Range : 5 to 40MHz
Supply Voltage [V_{cc}] : +3.3V
Frequency / Temperature Characteristics : Max. ±10×10^{-9}
Operating Temperature Range : -40 to +85°C
Power Consumption : at stable Max. 1.0W

NH20M20LB
(21.5×21.5×11.0mm)
RoHS Pb Free

High precision crystal oscillator (Twin-OCXO)
Product Shape : Pin type
Nominal Frequency Range : 5 to 40MHz
Supply Voltage [V_{cc}] : +3.3V
Frequency / Temperature Characteristics : Max. ±3×10^{-9}
Operating Temperature Range : -40 to +85°C
Power Consumption : at stable Max. 1.2W

NH25M22TA
(25.4×22×12.1mm)
RoHS Pb Free

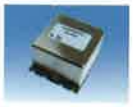
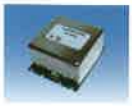
High precision crystal oscillator (Twin-OCXO)
Nominal Frequency Range : 5 to 40MHz
Supply Voltage [V_{cc}] : +3.3V
Frequency / Temperature Characteristics : Max. ±3×10^{-9}
Operating Temperature Range : -40 to +85°C
Power Consumption : at stable Max. 1.2W

NH37M28LK NEW
(37×28×16mm)
RoHS Pb Free

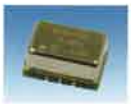
High precision crystal oscillator (Twin-OCXO)
Excellent Holdover stability (Typ. 1µs/8h)
Product Shape : Pin type
Nominal Frequency : 10MHz
Supply Voltage [V_{cc}] : +5V
Frequency / Temperature Characteristics : Max. ±0.2×10^{-9}
Operating Temperature Range : -40 to +85°C
Power Consumption : at stable Max. 1.2W

NH37M28LN NEW
(37×28×12.7mm)
RoHS Pb Free

High precision crystal oscillator (Twin-OCXO)
Frequency adjustment by digital control method (I2C control)
Product Shape : Pin type
Nominal Frequency Range : 10MHz
Supply Voltage [V_{cc}] : +5V
Frequency/Temperature Characteristics : Max. ±0.5×10^{-9}
Operating Temperature Range : -40 to +85°C
Power Consumption : at stable Max. 1.6W

NH25M22WH (25.4×22×14.3mm) RoHS Pb Free		**Low phase noise and high stability Crystal Oscillator** Nominal Frequency : 10MHz Supply Voltage [V_{CC}] : +5V Frequency / Temperature Characteristics : Max. ±3×10^{-9} Operating Temperature Range : 0 to +70°C Power Consumption : at stable Max. 1.1W Long-term Frequency Stability : Max. ±30×10^{-9} / year Near-carrier phase Noise Characteristics : -100dBc / Hz at 1Hz offset
NH25M22WG (25.4×22×12.1mm) RoHS Pb Free		**Low phase noise and high stability Crystal Oscillator** Nominal Frequency : 10MHz Supply Voltage : +3.3V Frequency/Temperature Characteristics : Max. ±10×10^{-9} Operating Temperature Range : 0 to +70°C Power Consumption : at stable Max. 1.0W Long-term Frequency Stability : Max. ±30×10^{-9} / year Low near-carrier phase noise characteristics. -100dBc / Hz at 1Hz offset
NH25M25TE NEW (25.4×19×12.1mm) RoHS Pb Free		**Supports wide temperature range (-40 to +85°C)** Nominal Frequency : 10MHz, 20MHz Supply Voltage : +5V (10MHz), +3.3V (20MHz) Frequency/Temperature Characteristics : ±10×10^{-9} Operating Temperature Range : -40 to +85°C Power Consumption : at stable Max. 1.3W Long-term Frequency Stability : Max. ±30×10^{-9} / year(10MHz), Max. ±80×10^{-9} / year(20MHz) Low near-carrier phase noise characteristics. -100dBc / Hz at 1Hz offset

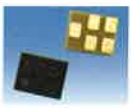
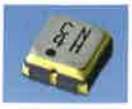
Digital Controlled Crystal Oscillator (DCXO)

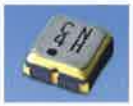
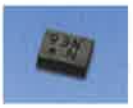
NT14M09TA (14.3×9.4×6.5mm) RoHS Pb Free		**Low current consumption and high stability (Twin-DCXO)** Nominal Frequency Range : 5 to 40MHz Supply Voltage [V_{CC}] : +3.3V Frequency / Temperature Characteristics : Max. ±50×10^{-9} Operating Temperature Range : -40 to +85°C Current Consumption : Max. 35mA Same foot pattern as the same size OCXO (foot pattern compatible).

Crystal Filter

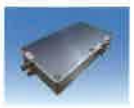
21E7.5A (NM7050SA) (7.0×5.0×1.35mm) RoHS Pb Free		**Surface-mount type crystal filter** Number of Poles : 2 Nominal Frequency : 21.7MHz 3dB Passband Width : Min. ±3.75 kHz Stop Bandwidth : Max. ±12.5 kHz at 15 dB Insertion Loss (Insertion Attenuation) : Max. 2 dB Terminating Impedance : 850Ω // 6 pF
45E15A (NM7050SA) (7.0×5.0×1.35mm) RoHS Pb Free		**Surface-mount type crystal filter** Number of Poles : 2 Nominal Frequency : 45MHz 3dB Passband Width : Min. ±7.5kHz Stop Bandwidth : Max. ±25 kHz at 13 dB Insertion Loss (Insertion Attenuation) : Max. 3 dB Terminating Impedance : 1000Ω // 4 pF

SAW Device

WFC68K0433CJ NEW (3.0×3.0×1.05mm) RoHS Pb Free		**For automotive RKE (Remote keyless entry system)** Nominal Frequency : 433.92MHz Insertion Loss : Max. 2.4dB Pass Bandwidth : ±0.17MHz Operating Temperature Range : -40 to +95°C Terminating Impedance : 50Ω (with matching)
WFF93A1582UE NEW (1.4×1.1×0.6mm) RoHS Pb Free		**For GPS/GLONASS/BEIDOU.** Nominal Frequency : 1582.355MHz Insertion Loss : 2.0dB Pass Bandwidth : 46.61MHz Operating Temperature Range : -40 to +85°C Terminating Impedance : 50Ω
WFC38E1588CD NEW (3.0×3.0×1.05mm) RoHS Pb Free		**For GPS/GLONASS/BEIDOU.** Nominal Frequency : 1588MHz Insertion Loss : Max. 2.0dB Pass Bandwidth : 56MHz Operating Temperature Range : -40 to +85°C Terminating Impedance : 50Ω
WFB40F2535CE (3.0×3.0×1.05mm) RoHS Pb Free		**For base station RF** Nominal Frequency : 2535MHz Insertion Loss : Max. 3.3dB Operating Temperature Range : -30 to +85°C Terminating Impedance : 50Ω Pass Bandwidth : Min. 70MHz

WF748D0140CD (7.0×5.0×1.6mm) RoHS Pb Free		**For base station IF** Nominal Frequency : 140MHz Insertion Loss : Max. 11dB　　Pass Bandwidth : Min. 23.9MHz Operating Temperature Range : +23 to +27°C Terminating Impedance : 50Ω
WFC11B0922CG (3.0×3.0×1.05mm) RoHS Pb Free		**For land mobile radio system (Cordless telephone).** Nominal Frequency : 922.5MHz Insertion Loss : Max. 3.5dB Pass Bandwidth : ±2MHz Operating Temperature Range : -20 to +85°C Terminating Impedance : 50Ω
WFC93B0429CL (3.0×3.0×1.05mm) RoHS Pb Free		**For specified low power radio.** Nominal Frequency : 426MHz Insertion Loss : Max. 3.5dB Pass Bandwidth : ±0.5MHz Operating Temperature Range : -20 to +70°C Terminating Impedance : 50Ω
WFC30B0924FF (1.4×1.1×0.5mm)		**For specified low power radio.** Nominal Frequency : 924MHz Insertion Loss : Max. 3.2dB Pass Bandwidth : 8MHz Operating Temperature Range : -40 to +85°C Terminating Impedance : 50Ω
WFC48H0924CF (3.0×3.0×1.05mm)		**For specified low power radio.** Nominal Frequency : 924MHz Insertion Loss : Max. 3.0dB Pass Bandwidth : 8MHz Operating Temperature Range : -40 to +85°C Terminating Impedance : 50Ω
WFD79C0925FG (1.4×1.1×0.5mm) RoHS Pb Free		**For short-range wireless** Nominal Frequency : 925.8MHz Insertion Loss : Max. 3.0dB　　Pass Bandwidth : Min. 4.6MHz Operating Temperature Range : -25 to +75°C Terminating Impedance : 50Ω

Frequency Synthesizer

S6R6G6R6GA (140×70×22mm) RoHS		**Best suited for local oscillator with low phase noise and low spurious emission.** Frequency Range : 6570.50 to 6589.75MHz Frequency Setting Resolution : 125kHz step SSB Phase Noise : Max. -47dBc / Hz (Integrated value of 1kHz to 2MHz) Frequency Stability : Depends on External Reference Signal Within ± 5×10^{-6} / 10 years (Internal TCXO Stability)
S010G010GA (110×60×22mm) RoHS		**Best Suited for Local Oscillator with Low Phase Noise and Low Spurious.** Frequency Range : 4GHz to 10GHz Frequency Setting Resolution : 1MHz step Frequency Stability : Depends on External Signal. (Internal TCXO Stability) Max. ±3×10^{-6} Spurious Harmonics : Max. –30dBc Spurious Non-harmonics Max. –60dBc

Optical Device

Bonding-type Optical Low-pass Filter		Pseudo-signals can be removed by combining a crystal phase plate (crystal wavelength plate), and an optical low-pass filter in the horizontal, vertical, or any direction of your choice. Filter glass combination, coating processing, and blacking processing are available upon request.

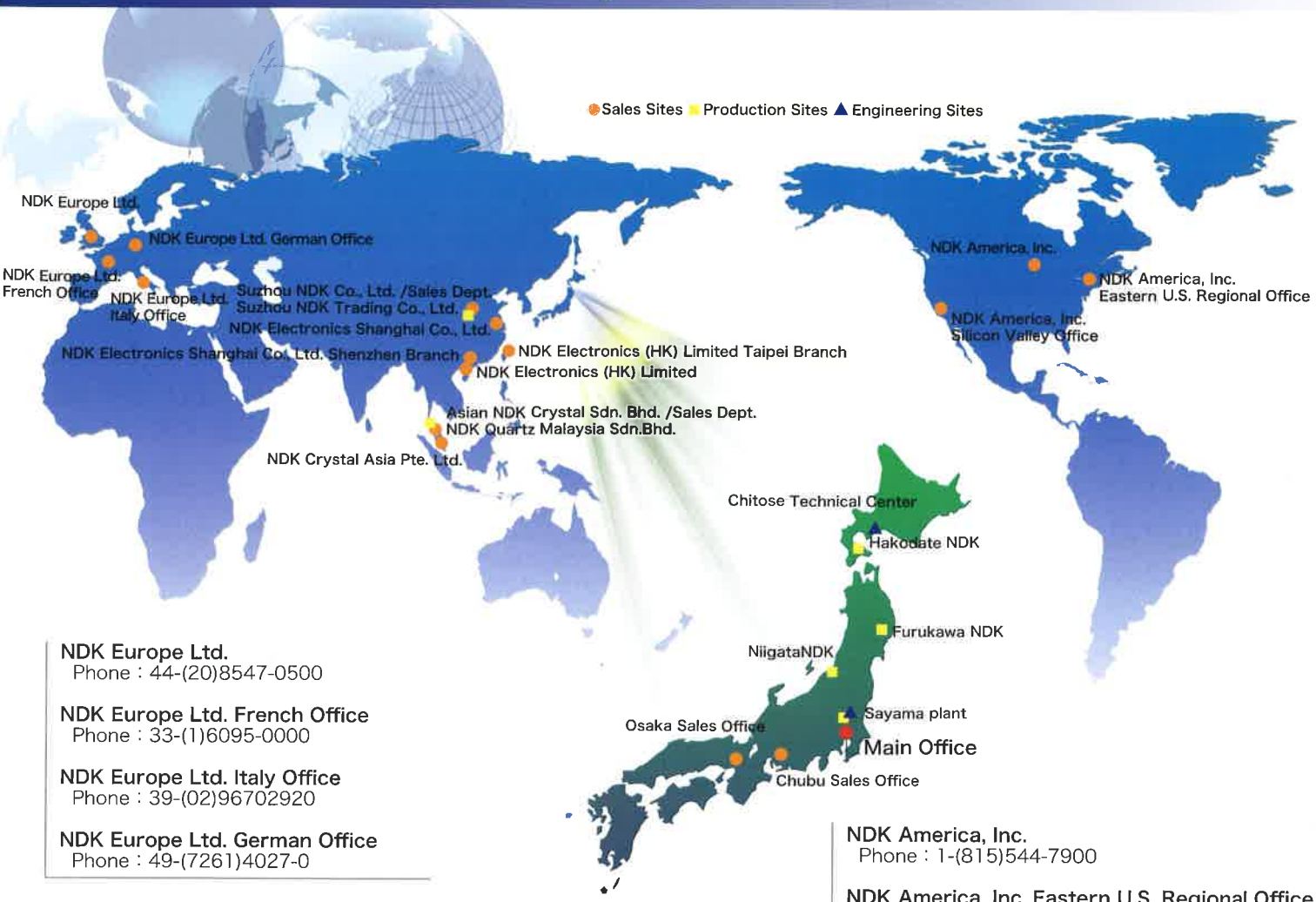
Biosensor

NAPiCOS(*1) series /NAPiCOS Auto /NAPiCOS Auto TS		**NAPiCOS series / "NAPiCOS system", "NAPiCOS Auto", and "NAPiCOS Auto TS"** A possibility of trace amount measurement with nano and pico level is infused into the word NAPiCOS as a new measurement technology proposed by high technology crystal products manufacturer NDK. [NAPiCOS system & NAPiCOS Auto] with QCM technology base can be used for real time monitoring for Immuno-reaction, Protein binding, DNA binding, etc. [NAPiCOS Auto TS is best suited QCM systems for taste analysis. (*1) NAPiCOS is a coined word created by NDK, combining the words "nano," "pico" and "sensor.
QCM(*2) sensors		QCM sensors enable users to make a differential measurement with 1 sensor (The world 1st. "Twin sensor (QCM twin sensor)") having two electrodes on the crystal chip. Additionally, The systems can also be used as Taste sensor, putting lipid membrane on the electrodes. (*2) QCM stands for "Quartz Crystal Balance", and is one of the measurement methods for monitoring micro-mass, using quartz crystal.

Ultrasonic probe (Transducer)

Product for 2D imaging and 3D imaging NDK has a medical manufacturing licence.		**NDK has a probe line up for each application and can produce customer's designed products** *Customers can decide a specification. (frequency, element pitch and element number etc.) *NDK can design an outer shape as per customer's request. Moreover, the attestation of "ISO13485 : 2003" that is International Standard of the quality management system in medical devices acquired, and we will deliver secure, safe and high-quality product for medical devices.

Group Networks



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