# Crystal Oscillator

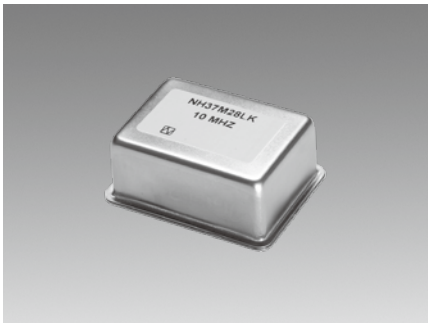
NDK Crystal Bridge to the Future

## NH37M28LK

**High Precision Oscillator (Twin-OCXO) for Fixed Communication Equipment**

### ■ Main Application

- Base stations for system mobile communications
- High-end router
- Synthesizer
- Measuring instrument
- Exchanger




### ■ Features

- Excellent temperature characteristics.
- Supports wide temperature range.
- Excellent Holdover stability.
- Frequency adjustment by digital control method ($I^2C$ control). (Voltage contorol method ($V_{cont}$) is also possible.)

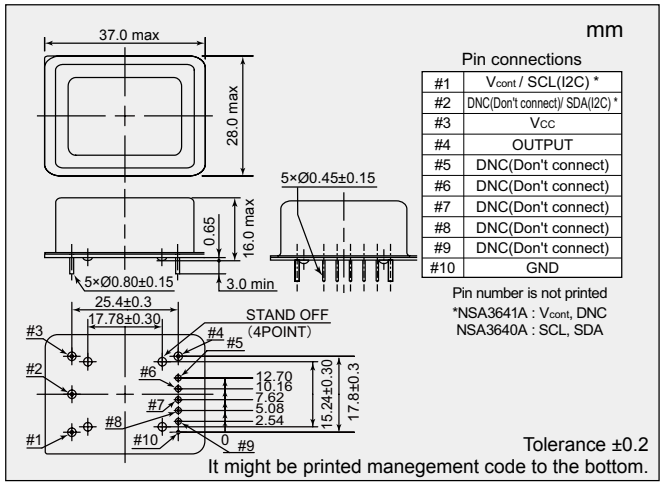
Pb Free

RoHS Compliant Directive 2011/65/EU

### ■ Specifications

| Item \ Model | | NH37M28LK | |
|---|---|---|---|
| Nominal Frequency $f_{nom}$ (MHz) | | 10 | |
| Supply Voltage Vcc (V) | | +5 | |
| Load Impedance $C_L$ (pF) | | 15 | |
| Operating Temperature Range $T_{opr}$ (°C) | | –40 to + 85 | |
| Storage Temperature Range $T_{str}$ (°C) | | –40 to + 85 | |
| Power Consumption $P_{CC}$ (W) | at start | Max. 3.5 (Typ. 3.0) | |
| | when stable, at +25 °C | Max. 1.2 | |
| Frequency Tolerance $\Delta f/f_{nom}$ | at +25°C, $V_{cont}$ = Center, before shipment | Max. $25\times10^{-9}$ | |
| Frequency/Temperature Characteristics $\Delta f/f$ | at Operating Temperature Range | Max. $\pm0.2\times10^{-9}$ | |
| Frequency/Voltage Coefficient $\Delta f/f$ | $V_{CC}$ ± 5% | Max. $\pm0.2\times10^{-9}$ | |
| Long-term Frequency Stability $\Delta f/f$ | Based on frequency after 7 days operation | Max. $\pm0.2\times10^{-9}$ / day | |
| | | Max. $\pm50\times10^{-9}$ / year | |
| Stabilization Time (min.) | Time within specified frequency tolerance after power on at +25°C, based on frequency after 60minutes operation. | Max. 5 / within ± $10\times10^{-9}$ | |
| Hold Over | Refer *1 | Typ. ±1.0μs / 8h | |
| Frequency Control Method | | Analog Control | Digital Control ($I^2C$) |
| Frequency Control Range $\Delta f/f$ | | $V_{cont}$ = +2.5V±2.5V | 0x800000 to 0x7FFFFF<br>Center : 0x000000 |
| | | ±0.3 to $\pm0.5\times10^{-6}$ | ±0.3 to $\pm0.5\times10^{-6}$ |
| Frequency Change Polarity | | Positive | |
| Linearity (%) | | Max. ±5 | |
| Output Voltage | | LVCMOS $V_{OL}$ : Max. +0.4 V $V_{OH}$ : Min. +2.4 V | |
| Symmetry (%) | at ($V_{OH}$ + $V_{OL}$) / 2 | 45 to 55 | |
| Specification Number | | NSA3641A | NSA3640A |

### ■ Dimensions




Pin connections

| | |
|---|---|
| #1 | $V_{cont}$ / SCL(I2C) * |
| #2 | DNC(Don't connect)/ SDA(I2C) * |
| #3 | $V_{CC}$ |
| #4 | OUTPUT |
| #5 | DNC(Don't connect) |
| #6 | DNC(Don't connect) |
| #7 | DNC(Don't connect) |
| #8 | DNC(Don't connect) |
| #9 | DNC(Don't connect) |
| #10 | GND |

Pin number is not printed
*NSA3641A : $V_{cont}$, DNC
NSA3640A : SCL, SDA

We offer dedicated tool for evaluation of this product
Please specify the model name, frequency, and specification number when you order products.
For further questions regarding specifications, please feel free to contact us.

### ■ Reference Value

| Phase Noise (at 10MHz) | Offset Frequency | dBc/Hz | Offset Frequency | dBc/Hz |
|---|---|---|---|---|
| | 1 Hz | Typ. –83 | 1k Hz | Typ. –152 |
| | 10 Hz | Typ. –110 | 10k Hz | Typ. –157 |
| | 100 Hz | Typ. –135 | 100k Hz | Typ. –160 |

### ■ *1 Holdover condition

- After 7days operation.
- Ramp rate: 10 °C/1h.
- Standby time: each 0.5h.
- Temp. condition Range: 20 °C window in operating Temp. range.