

## ■ Terminology

The main terms used for crystal oscillators are explained as follows:

**Nominal Frequency:** The nominal value of the oscillator output frequency.

**Overall Frequency Tolerance:** The degree of deviation of the oscillator output frequency from the nominal frequency. (This includes deviations in temperature, normal temperature and power supply variations.)

**Operating Temperature Range:** A temperature range within which the output frequency tolerance of an oscillator and other output signal characteristics can meet the set specifications.

**Absolute Maximum Rating:** The guaranteed maximum rated value of an oscillator; this limit must never be exceeded. If this rated value has been exceeded, the reliability of the oscillator may decrease or the oscillator itself may be destroyed.

**Standby Function:** A function that controls (starts or stops) the oscillation of an oscillator with external digital signals.

**Tristate:** A crystal clock oscillator with a function that enables a high impedance output state when oscillation is stopped by the standby function.

**Current Consumption:** The value of the current from a power supply terminal when an oscillator is oscillating.

**Rise Time (Tr):** The time it takes when the output waveform changes from "L" level to "H" level. See the output waveform diagram for each product series.

**Fall Time (Tf):** The time it takes when the output waveform changes from "H" level to "L" level. See the output waveform diagram for each product series.

**Fan-out:** The number of TTL gates that can be connected to the output terminal of an oscillator.

**Oscillation Start Time:** The time it takes until the output amplitude of an oscillator reaches a specified value after the power supply voltage applied to the oscillator has been turned on.

## ■ Precautions for Use

The handling of a crystal oscillator is a little different from that of other electronic components. Please read the following precautions carefully in order to use NDK's crystal oscillators correctly and to ensure optimum performance of the unit.

### 1. Power supply bypass capacitor

When using this product, place a bypass capacitor, approx 0.01  $\mu$ F, between the power supply and the GND (as close to the product terminal as possible).

### 2. Mounting of a surface-mount crystal clock oscillator

#### (1) Rapid temperature change after a board has been installed

When the material of a mounting board for a surface-mount crystal clock oscillator package with ceramics has an expansion coefficient that is different from that of the ceramic material, the soldered fillet section may crack, if subjected to repeated extreme temperature changes over a long time. Under such conditions, it is recommended that the situation is checked beforehand.

#### (2) Shock by automatic mounting

When a crystal clock oscillator is adsorbed or chucked in the course of automatic mounting or a shock that exceeds the specified values occurs when the oscillator is mounted on the board, the characteristics of the oscillator will change or deteriorate.

#### (3) Stress by board bending

After a crystal clock oscillator has been soldered to a printed board, bending the board may cause the soldered part to peel off or the oscillator package to crack due to mechanical stress.

### 3. Resistance to drop impact

Products in this catalogue have been designed to be highly

resistant to free drop impact (up to three times). However, if by mistake the product has been dropped from a desk, etc., to ensure optimum performance, it is recommended that you measure the performance of the product again or that you request us to measure it again.

### 4. Static electricity

Products in this catalogue use CMOS IC's as their active elements. Therefore, handle the products in an environment where countermeasures against static electricity have been taken.

### 5. High temperature resistance

Concerning high temperature resistance, when a product is used in an extreme environment where the temperatures of +125 °C for 24 hours are exceeded, all the characteristics of the product cannot be guaranteed. Pay particular attention to storing the product in the correct temperature range.

### 6. EMI

When you take EMI into consideration, reduction-types 2765E or Low power supply voltage type (ex.2.5V,1.8V,1.5V or 0.9V) are recommended. In addition, please consult us beforehand concerning the combination of the two types of countermeasures against EMI mentioned above.

### 7. Ultrasonic cleaning

When ultrasonic cleaning of a product in this catalogue is carried out, according to its mounted state and cleaning conditions, etc., the product's crystal oscillator may suffer a resonance fracture. Before ultrasonic cleaning, make sure to check the conditions.

8. When using a crystal clock oscillator for special purposes, please feel free to contact us.