

# CRYSTAL OSCILLATORS

## APPLICATION NOTE

### ■ Electrical

#### 1 Power source

Be sure to connect the polarities to specified terminals correctly. Reversed connection or connection to a wrong terminal not specified may cause the parts used in a crystal oscillator to be damaged or result in non-oscillation.

Applying voltage exceeding the rated value may cause the same failure. Be sure to use a crystal oscillator at the rated voltage. If the applied voltage is less than the rated value, the oscillator may not satisfy the specified performance despite the fact that the parts in the crystal oscillator are not damaged.

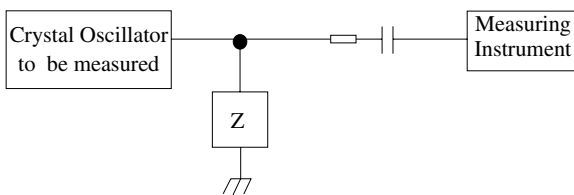
#### 2 Load impedance

Connection of a crystal oscillator should be made in terms of specified load impedance. The connection in terms of unspecified load capacitance may result in unspecified output frequency and output level or cause distorted wave forms to produce troubles. Especially for the load impedance reactance, the adjustment to the specified value is essential.

#### 3 Output frequency and level

Measure the output frequency and output level of a crystal oscillator. And at the same time, adjust the input impedance of a measuring instrument in such a way that it equals the load impedance of a crystal oscillator.

The following figure shows a case where the input impedance of a measuring instrument is different from the load impedance of a crystal oscillator. In such a case, it is necessary to make measurement in terms of high impedance sufficient for neglecting the impedance on the measurement system side.



Z: Load impedance of a crystal oscillator

### ■ Mechanical

#### 1 Shocks

Do not cause strong shocks. When carrying or attaching a crystal oscillator, be careful not to drop it or hit it on a hard object.

A no-oscillation defect mode may be caused by damage of parts inside oscillator.

When oscillator is shocked, please ensure that electrical characteristics are within specification before it is used.

#### 2 Attachment method

Be careful not to apply strong force to the terminals or the attachment screws of a crystal oscillator.

When attaching a crystal oscillator to a PC board, the distance between holes should equal the distance between the terminals of the crystal oscillator. If these distances are not equal, forced attachment may cause the terminals to be broken.

Do not bend the terminal of a hermetically-sealed crystal oscillator whose diameter exceeds 0.6mm. Even in the case of a terminal whose diameter is less than 0.6mm, be careful not to bend a terminal at the root directly. If the glass portion is cracked the insulation will not work well, thereby preventing the user from taking full advantage of the various features. The specifications of fastening torque are as shown below:

Screw diameter	Fastening torque
M2	0.196N • m
M2.6	0.392N • m
M3	0.49 N • m

In the mounting of oscillator with adjustment hole, please carefully mount it so that flux will not run inside the oscillator through the adjustment hole. Inside the cover, variable parts such as variable condenser, variable resistance are installed.

## APPLICATION NOTE

### 3 Soldering

Temperature: 260°C (maximum), Duration: 5 seconds (maximum)

Do not solder directly onto the cover or the base.

### 4. Mounting of surface mount type crystal oscillator

4-1

Severe temperature change;

Under severe temperature change condition, solder portion may receive crack due to different temperature coefficients between print wire board material and surface mount type crystal oscillator ceramic package.

To avoid this problem, if such case is expected, please contact us for temperature condition, etc. beforehand.

4-2

Shock from automatic mounting;

If the automatic mounting process applies too much mechanical shock to crystal oscillator, electrical characteristics may deteriorate. Please note.

4-3

(Stress caused by bending the PC board) If the PC board is bent after a crystal oscillator is soldered to the PC board, the mechanical stress may cause the soldered part to come off or the crystal oscillator package to crack.

### 5 Cleaning

For the oscillator models (Except, 5921A TYPE) in this catalogue, please do not apply soaking cleaning.

### ■ Storage

Even if a crystal oscillator is left unused for a long time without applying any voltage at the temperature range specified, the features will maintain their usefulness. However, electrical features such as oscillation frequency after a long period of use or mechanical aspects such as the soldering characteristics, etc., may change depending on how long a crystal oscillator is left unused. Therefore, it is recommended that you do not leave a crystal oscillator unused for a long period of time (over three months), although the length of the relevant period may differ depending on the product's structure and specifications.

In addition, do not leave a crystal oscillator in a high-temperature, high-humidity environment (relative humidity of 75% or more), or at a site where poisonous gas is present (in particular, corrosive gas). Also, if you use a crystal oscillator in an environment that it is exposed to sea breezes, or in a place that is so humid that it produces condensation or frost, we recommend that you use an oscillator with a sealed structure.

Please use +5°C to +45°C & 10% to 75% for recommendable storage (Temperature/humidity) condition.

The NT7052W, NT5032S, NT4025B and NT3225B series are dry-packed in laminated aluminum bags. For these products, refer to the table below.

Please keep the oscillator in the ordinary temperature and humidity that are suggested as below table.

	Before open dry bag	After open dry bag
Temperature	+5°C to +45°C	+30°C max.
Humidity	10% to 75%	70% max.
Period	6 months	48 hours *

(table)

\* It is desirable for the oscillator to be within 48 hours after taking out of dry bag.

In case the oscillator is not used within suggested period, the oscillator should be handled as either (a) or (b).

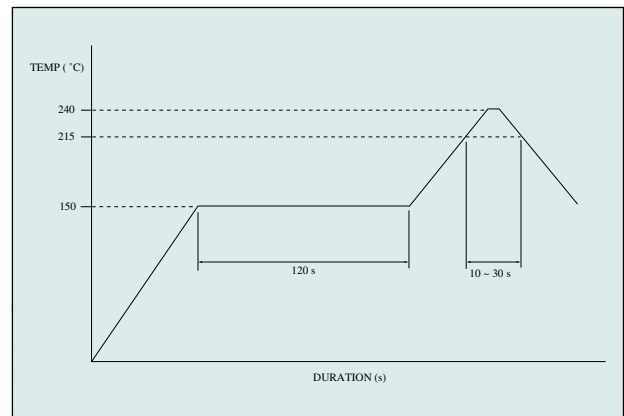
(a) Please pack the oscillator into used dry bag with a desiccant and seal it up by heat sealer etc.

In case the heat sealer is not available, sealing up with cellophane tape or a vinyl tape will do.

(b) Please preserve it in desiccator.

### ■ Reflow Soldering

Drawing below shows standard temp. profile for IR reflow soldering. (Except. Low-Temp. reflow soldering.) When reflow soldering by a lead-free solder is required, please contact us separately.



outer-space devices, nuclear power control devices, medical devices that have a direct impact on people's lives, or other purposes that require a high degree of reliability. Also please consult us if you intend to use the product for transport devices and therefore require a high degree of safety.