

QUARTZ CRYSTALS OSCILLATORS

I. ELECTRICAL

1) Supply voltage Most of Abracon oscillators utilize a CMOS technology ASIC chip with extreme ESD sensitivity. When apply power to the oscillator unit, be sure to check the polarities before connecting to the terminals. Reversed polarity connections may cause the unit to be damaged electrically (dead) or mechanically (burn, color change). Pin 1 is usually identified by a black dot marked on cover. Be sure to apply voltage to the oscillator not exceeding the maximum specified value which is typically 7Vdc max. for most CMOS IC. Applying under rating voltage could result to (unstable) oscillation. Although many metal can oscillators have built-in bypass capacitors, it is a good practice to add an external bypass capacitor 0.01 μ F near the Vdd terminal. The external capacitor is used as an overimpressed voltage and overcurrent protective device.

Figure 1 shows a typical layout out for a surface-mount crystal oscillator.

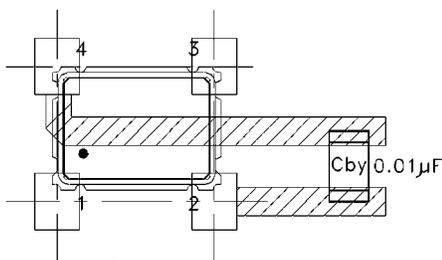


Figure 1

2) Load impedance Oscilloscope impedance shall be greater than 1M Ω with probe capacitance less than 15pF. The load applied shall include probe capacitance. All lead length should be kept as short as possible especially ground trace. Output trace from oscillator output to the load (next IC) shall be kept short and avoided layout in parallel or cross with another hot signal trace. Stray capacitance and inductance have major effect on output impedance of the oscillator unit and shall be minimized.

3) Output frequency Output frequency shall be measured with a precision frequency counter using a reference external time base. Make sure to stabilize the crystal oscillator (warm-up) before recording the final frequency value, especially on high frequency and high current units.

II. MECHANICAL

1) Vibration and shock Do not apply or cause sudden shock and vibration exceeding its maximum specifications to the unit. Severed or being hit with a hard object could damage the unit electrically and mechanically. Please test the unit if dropped before assembling or using.

2) Mounting

The following precautions shall be applied during handling and mounting of through-hole crystals and oscillators:

- Do not forcibly spread or bend the leads into a socket or PCB holes. This will avoid cracking the glass insulation around the leads of the component.
- Do not apply excessive soldering heat – Recommended Maximum Temperature is 380°C using a hand soldering iron for a Maximum Duration of 3 seconds.

- When dip soldering/wave soldering, the soldering condition is to be 260°C Maximum Temperature for a Maximum Duration of 10 seconds.

It is recommended that the crystal be mounted in an upright position. When bending the leads prior to installation, there must be a minimum distance of 3mm from the case body to the beginning of the bend in order to avoid cracking the glass insulation around the leads of the component.

- When soldering, do not apply the heat to the case body of the component as exposure to soldering heat would deteriorate the performance of the product.

The following precautions shall be applied to all surface-mount crystals and oscillators:

- Use the appropriate reflow condition as recommended on the unit specification. Please make sure not to exceed the recommended reflow profile parameters:

The peak temperature, the maximum duration at each stage, the number of exposures/reflow cycles, the rate of temperature change vs. time, etc.

Note: This is a general guideline. Individual product series may have different recommended soldering conditions. Please contact Abracon Corporation for details when in doubt.

3) Cleaning

It is recommended that Aqueous cleaning methods such as flowing water or jet pressure water cleaning is used in order to avoid physical damage caused by solvents. Some solvents, such as those containing Chlorine, may cause discoloration on some metallic component covers as well. Do not exceed the maximum recommended temperature when cleaning.

Ultrasonic cleaning should be avoided due to the risk of damage to the crystal element.

III. PACKAGING

Although an anti-static protection circuit is built-in the ASIC, excessive static electricity level may damage the unit. Abracon uses Non-conductive packing materials for all oscillators. Be sure to ground with ESD strap before handling the device.

IV. HANDLING UNUSED TERMINALS

Some Abracon oscillators include Tristate function. Although there is an internal pull-up resistor to prevent floating, it is recommended to terminate the tristate terminal to Vdd with a resistor of 100k Ω in series.

V. STORING

Please store all units at normal temperature and humidity. High humidity may cause deterioration to units. Avoid storing over a long period. Please perform visual and electrical inspections before using once the units are stored over a long period.