Thru-Hole Tuning Fork

Model: NC15LF/NC26LF/NC38LF **RoHS Compliant / pB Free** **Rev. 1/13/2012**

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FEATURES

- Miniature Packages
- Low Cost
- Cold Weld Design
- Long Term Stability
- Tight Tolerance

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• PART NUMBER SELECTION

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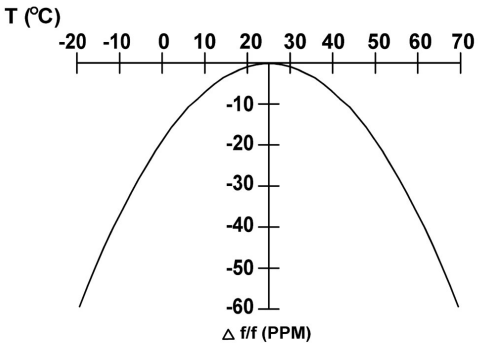
Part Number	Model Number	Frequency Stability	Operating Temperature	Frequency
298LF-Frequency-xxxxx	NC15LF	-0.04 PPM / (Δ°C)²	-20 °C~ +60 °C	32.768 kHz
299LF-Frequency-xxxxx	NC26LF	-0.04 PPM / (Δ°C)²	-20 °C~ +60 °C	32.768 kHz
300LF-Frequency-xxxxx	NC38LF	-0.04 PPM / (Δ°C)²	-20 °C~ +60 °C	32.768 kHz

• STANDARD SPECIFICATIONS

PARAMETERS	MAX (unless otherwise noted)
Frequency	32.768 kHz
Frequency Tolerance @ 25ºC	± 20 PPM
Frequency Stability Temperature Coefficient	-0.04 PPM / (Δ°C)²
Temperature Range Turnover (TO) Operating (TOPR) Storage (TSTG)	 +20ºC ~ +30ºC -20ºC ~ +60ºC -30ºC ~ +70ºC
Equivalent Series Resistance (RS) NC15 / NC26 NC38	 50 kΩ 35 kΩ
Load Capacitance (CL)	12.5 pF (Standard) 6 pF (Optional)
Insulation Resistance @ 100VDC	500 MΩ Min
Drive Level	1.0 µW
Aging per year	±3 PPM

All specifications subject to change without notice.
Note: Can should not be soldered to the circuit board or grounded. If securing the can to the board is desired, a rubber adhesive is recommended.

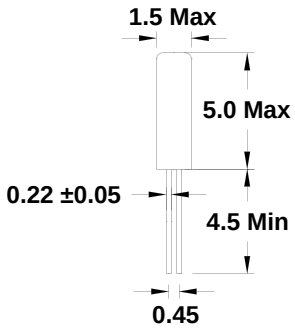
Parabolic Temperature Curve



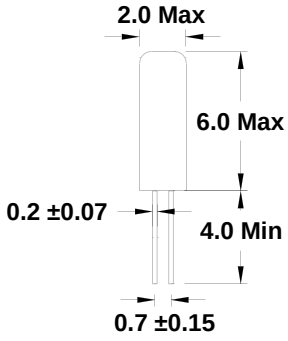
To determine frequency stability, use parabolic curvature (K).
For example: What is stability at 45°C?

1) Change in T (°C) = 45-25 = 20°C
2) Change in frequency = -0.04 PPM * (Δ C)²
= -0.04 PPM * (20)²
= -16.0 PPM

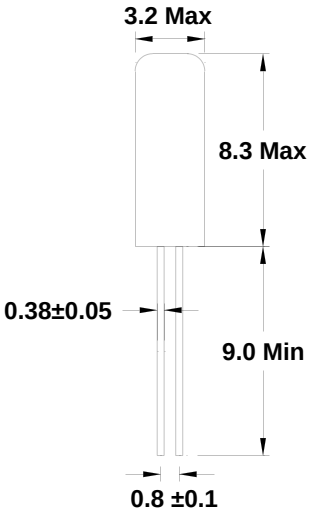
NC15LF



NC26LF



NC38LF



All dimensions are in millimeters.

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1. Mounting Precautions

1.1 Lead Type Crystal Units

1.1.1. Structure

Tubular crystal units are hermetically sealed using glass (see Figures 1 and 2).

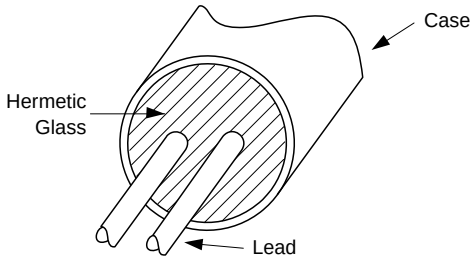

Figure 1

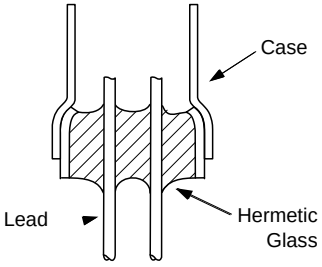

Figure 2

1.1.2 Unbending the lead

(1) DO NOT pull the lead excessively if unbending a lead or removing a crystal unit. The excessive force may crack the glass and reduce the degree of vacuum. This may eventually result in deterioration of the characteristics and may also break the crystal chip see Figure 3).

(2) Unbend the lead by pressing on the bent part from both the upper and lower sides with fixing the bottom of lead tightly. (see Figure 4).

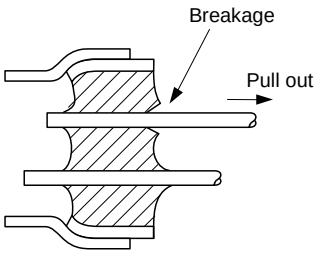

Figure 3

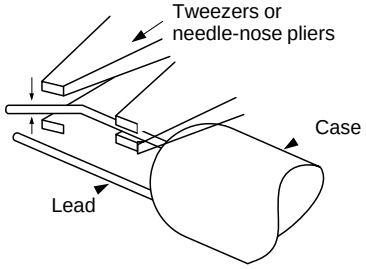

Figure 4

1.1.3 Bending the lead

(1) Bend the lead so that the lead will remain straight for more than 0.5mm from the case when soldering a crystal unit after bending. If not, the glass may be cracked (see Figures 5 and 6).

(2) Always leave a length greater than the case diameter when bending a lead after soldering (see Figure 7).

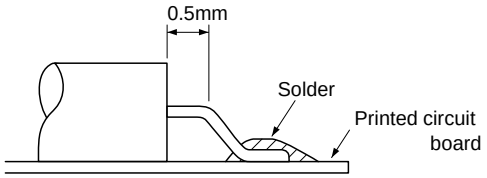

Figure 5

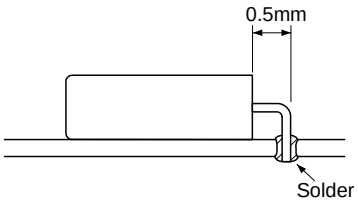

Figure 6

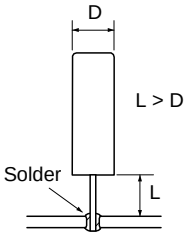

Figure 7

Soldering directly to the case will reduce the degree of vacuum and may result in deterioration of the characteristics and may break the crystal chip.

Make the length from the case to the printed circuit board (L) longer than the case diameter (D) so that the lead wire will not be pulled in case the crystal unit falls over.

1.1.4 Soldering

When mounting or removing a quartz crystal unit, heat the lead part at 300°C or lower for 5 seconds or less (in the case of a lead-type conventional product). A long period of time of heating may result in deterioration of the characteristics and may break the crystal unit. Be sure to keep the case at or below 150°C.