Specifying Quartz Crystals

Quartz crystals are the most technically simple product we offer; the package contains only a piece of quartz wafer, all the supporting circuitry needed to create the oscillation must be provided by the customer’s circuit. The quartz wafer inside is cut and shaped to give a resonant frequency within the specified limits. Our quartz crystal part numbers all contain the code XTAL.

The electrical parameters are given on the specification to facilitate the correct circuit design. Our Application Support team can provide assistance if required; please contact one of our sales offices.

The limits given in the following specifications are indicative of the standard crystal design, in the event that a specification is needed which is outside the standard crystal designs offered please contact our Sales team.

A typical quartz crystal specification reads like this:

10.0MHz 12SMX-B
50/50/-20 to 70C/20/ FUND TE

The data in the example above is translated in the following order:

- Frequency
- Model & Variant
- Frequency Tolerance @ 25°C
- Frequency Stability (over operating temperature range)
- Operating Temperature Range
- Load Capacitance
- Overtone
- Additional Text Code

**Frequency**

Frequency is normally specified in kilohertz (kHz) up to 999.999kHz and in megahertz (MHz) from 1.0MHz. All our computer-generated transaction documents follow this standard convention automatically.

The frequency should be described to seven significant figures. If seven significant figures are not used, we assume that any figure that might follow those given may be taken as zero. Thus a frequency given as 16.6MHz will be taken as 16.60, not 16.6666.

Some specifiers extend the use of kHz to all crystals operating in fundamental mode, reserving MHz for overtones, this method is not used by us. To minimise the possibility of misunderstanding it is best to use the standard method and specify fundamental or overtone mode separately.

Please contact one of our Sales office for details of developed frequencies.

**Model**

Before manufacture of the crystal can start, the model must be defined. Each model covers a frequency range which is defined in the relevant specification. The model information should also cover any mechanical variants required such as a top wire or cropped leads. For leaded versions, the following variants for example are available for most crystals, either singly or in some cases, in combination:

- 3 lead base
- Top wire

**Contact Details:**

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USA: +1.760.318.2824
Email: info@iqdfrequencyproducts.com
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Unless individual data sheets state Bulk packaging, surface mount versions will be Tape & Reel packed. Please note: only complete reels are sold. Sample quantities are available on request

<table>
<thead>
<tr>
<th>Load Condition</th>
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<tr>
<td>The characters ‘SR’ are used to denote calibration of the crystal at series resonance. If it is to be calibrated at load resonance the characters represent the circuit load capacitance in pF.</td>
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<th>Overtone Order</th>
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<td>Quartz crystals resonate in specific “modes” depending upon the frequency in question and oscillator circuit configuration in which it is used. The main mode of operation is called “fundamental”. i.e. a 10MHz crystal vibrates at a frequency of 10MHz However for high frequency use, quartz crystals can be made to operate at odd multiples of its fundamental frequency. These multiples are termed “overtones” and are denoted by their multiple as: 3rd, 5th, 7th, 9th. e.g. a 10MHz crystal can be made to operate at its 3rd overtone which is approximately 3 times its fundamental frequency. If an overtone mode crystal is chosen then the circuit design must include the relevant components required to suppress the fundamental mode of operation to ensure oscillation at the intended frequency. Where there is a cross-over band in the modes available, the mode required must be specified when ordering. For general use and simplicity of circuit design we recommend that fundamental mode be chosen where possible.</td>
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<tr>
<td>If the product is non-standard, the letter ‘T’ will appear at the end of the product specification. This refers to additional text on the data sheet to identify the non-standard elements of the specification.</td>
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<th>Packaging Codes</th>
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<tr>
<td>These are given directly after the part number for example LFXTAL012345Bulk and LFXTAL012345Reel are the same part packaged either loose in bulk pack or on tape and reel. Tray packaging is available as an option for some products</td>
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