



**What crystal frequency do you require?**

It is the desired operational crystal frequency for the circuit. It depends on the mode of operation (fundamental, overtone), and load capacitance.

**Which mode of operation?**

Fundamental or overtone. rfPIC and PICmicro MCU oscillators generally operate below 50Mhz, which is the usually upper frequency limit of AT-cut quartz crystals.

**Series or parallel resonant?**

This tells us how the crystal will be used in the oscillator circuit. Series resonant crystals are used in oscillator circuits that contain no reactive components in the feedback loop. Parallel resonant crystals are used in oscillator circuits that contain reactive components, like C1,C2. There is no difference in the construction of a series or parallel resonant crystal. A load capacitance (*CL*) must be specified in order to the crystal to operate at parallel resonant mode.

**What frequency tolerance do you desire? (RT Tolerance)**

This is the allowable frequency deviation plus and minus the specified crystal frequency. It is

specified in parts per million (ppM) at a specific temperature, usually + 25 degrees C. The designer must determine what frequency tolerance is required for the product design. For example, a PICmicro device in a frequency insensitive application the frequency tolerance could be 50 to 100 ppm. For a rfPIC device, the crystal frequency is multiplied up to the transmit frequency. Therefore the tolerance will be multiplied.

**What temperature stability is needed?**

This is the allowable frequency plus and minus deviation over a specified temperature range. It is specified in parts per million (ppM) referenced to the measured frequency at +25 degrees C. Temperature stability depends on the application of the product. If wide temperature stability is required, it should be communicated to US.

**What temperature range will be required?**

Temperature range refers to the operating temperature range. Do not confuse this with temperature stability.

**Which package do you desire?**

There are many crystal enclosures to choose from. You can select a surface mount or leaded enclosure. Consult with us about your product needs. The smaller the enclosure the higher the series resistance. This can result in oscillator not starting or stopping over a wide temperature range.

**What load capacitance (*CL*) do you require?**

This is the capacitance the crystal will see in the circuit and operate at the specified frequency. Load capacitance is required for parallel resonant crystals. It is not specified for series resonant crystals.

**What Equivalent Series Resistance (*ESR*) is required?**

Typically specified as a maximum resistance in ohms. Do not confuse ESR with motional resistance (*R1*). A lower ESR requires a lower drive level and vice versa. A danger exists in specifying too high an ESR where the oscillator will not operate.

**For additional information, Pleas Contact**

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