Aging
The relative frequency change over a certain period and is typically expressed as a maximum value in parts per million per year (ppm/year). Typically, aging is computed within the first 30 days to 90 days and predicted exponentially over a longer period usually a year.

Drive Level
A function of the driving or excitation current flowing through the crystal. The drive level is the amount of power dissipated in the crystal and is expressed in milliwatts or microwatts. Drive level should be kept at a safe minimum condition to assure proper start-up. Excessive drive level will result in possible long-term frequency drift or crystal fracture.

Equivalent Series Resistance (ESR)
The value of impedance the crystal exhibits in the operating resonant circuit.

Frequency Stability
The maximum allowable frequency deviation from ambient temperature over the operating temperature range. Frequency stability is expressed in parts per millions (ppm). The frequency stability is determined by cut type, angle cut, angle cut tolerance, mode of operation, package styles, and mechanical dimensions of the quartz blank.

Frequency Tolerance
The maximum allowable frequency deviation from a specified nominal frequency at ambient room temperature. Frequency tolerance is expressed in parts per millions (ppm).

Load Capacitance
Load capacitance (Cl) is the amount of capacitance that the oscillator exhibits when looking into the circuit through the two crystal terminals. Load capacitance needs to be specified when the crystal is used in a parallel mode.

Motional Capacitance
The capacitance of the nominal arm of the equivalent circuit. Motional Capacitance (C1) results from the elasticity of the quartz blank.

Operating Mode
The quartz crystal could operate at its Fundamental mode or harmonic modes. The fundamental mode is always the preferred oscillating mode. Odd harmonics such as 3rd, 5th, 7th, etc. are overtone modes.

Nominal Frequency
The specified center frequency of the crystal. Unit of frequency is Hertz (Hz). Quartz crystals are specified in kHz or MHz.

Pullability
When a crystal is operating at parallel resonance, it looks inductive in the circuit. As the reactance changes, the frequency changes correspondingly, thus change the pullability of the crystal. The difference in frequency between the Fs and Fa depends on the C0/C1 ratio of the crystal unit and the load capacitance CL.

Suntsu Electronics, Inc.
142 TECHNOLOGY DR., SUITE 150
IRVINE, CA 92618

Call: +1-949-783-7300 | Fax: +1-949-783-7301

Series Resonance vs. Parallel Resonance
When a crystal is operating at series resonance it looks resistive in the circuit. In series resonance, load capacitance does not have to be specified. The anti-resonant frequency occurs when the reactance in the series branch is equal to C0. When a crystal is operating at parallel resonance, it looks inductive in the circuit. The crystal equivalent circuit can be simplified as a series resistance with a reactance. The difference in frequency between the anti-resonant frequency and series resonance depends on the C0/C1 ratio of the crystal unit, and the inductance L1. In parallel resonance, the load capacitance is specified.

Shunt Capacitance
Shunt capacitance (C0) is the static capacitance between the electrodes (Ce) together with holder capacitance (Ch).

C0 = Ce + Ch

Ch varies between 0.6pF to 0.8pF depending on mounting method.

Spurious Responses
Unwanted resonance usually above the operating mode, specified in dB max. or number of times of main mode ESR value. Frequency range is specified within couple of hundred kilohertz.

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