

Specifying VCXOs

Voltage Controlled Crystal Oscillators (VCXOs) give a stable clock output waveform, which can be changed via an analogue voltage input. The technology makes use of the pullability of the crystal, its change in frequency due to change in load capacitance. The voltage input is used to vary the load capacitance of the crystal circuit within the oscillator, this gives a very controllable change in output frequency. This VCXO characteristic is used to tune the device to match the exact frequency required while the circuit is active. We use the code VCXO to denote our Voltage Controlled Crystal Oscillator part numbers.

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 officials.

The limits given in the data sheet are indicative of the standard VCXO oscillator design, in the event that a specification is needed which is outside the standard VCXO oscillator specifications offered please contact our sales representatives.

A typical VCXO specification reads like this:

80.0MHz CFPV-45
HCMOS $\pm 100.00\text{ppm}$ 0 to 70°C 3.3V $\pm 100\text{ppm}$
min APR

The spec shown above is not possible to make, suggest you change to the following:

20.0MHz CFPV-45 HCMOS $\pm 100\text{ppm}$ 0 to 70C
3.3V $\pm 100\text{ppm}$ min APR

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

- Frequency
- Model
- Output
- Frequency Stability (over operating temperature range)
- Operating Temperature Range
- Supply Voltage
- Pullability

Frequency

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

The VCXO 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 16.60MHz.

Model Number

The model number incorporates information which describes package type, output compatibility and supply voltage.

Frequency Stability

The frequency stability of a VCXO includes the initial adjustment tolerance at room temperature (with the control pin set to centre trim voltage: e.g. 2.5V) and the stability over the operating temperature range. This value is specified as parts per million' (ppm) and is available in ranges of; $\pm 10\text{ppm}$, $\pm 25\text{ppm}$, $\pm 50\text{ppm}$ and $\pm 100\text{ppm}$.

Frequency Pullability

The pullability is specified as the change in output frequency when the voltage control input is varied. This value is specified in 'parts per million' (ppm) and is available in various ranges, please see individual models for details.

Large pullability figures give a greater tuneable range, while smaller pullability figures give greater control. The pullability may be specified as either relative pulling or APR (absolute pulling range).

Relative pulling defines the actual ppm change which will be seen on the output when the voltage control line is varied from one extreme to the other and all other factors are held constant. Since no allowance is made for frequency shift due to other factors, this ppm change may not always be attainable when referenced to the nominal frequency.

APR defines the pulling which will always be available to the customer when referenced to the nominal frequency. An allowance is made for the shift in frequency due to factors such as temperature, ageing, supply voltage variations etc., these are subtracted from the relative pulling to give the Absolute Pullability Range.

Operating Temperature Range

Standard operating temperature ranges for VCXO's are:

- 0 to 70°C
- 40 to 85°C

Although general oscillators can continue to operate outside their normal temperature range with a degradation in frequency stability. However, oscillators can also undergo permanent damage if the temperature in which they are operated is excessive to the specifications stated in data sheet.

For other temperature ranges please contact one of our Sales offices.

Additional Text Code

If the product is non-standard, the letter 'T' for as long as we are using Goldmine this is correct, after we change to PIM a lot will change 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.

Packaging

Surface Mount (SMD) Products

Tape & reel in accordance with EIA-481

Quantities below the standard reel size to be supplied on cut tape.

Thru-hole (THT) Products

Reel = Tape & reel in accordance with EIA-468, only available to be supplied at full Standard Pack Quantity (SPQ)

Bulk = to be supplied loose in bag.

Tray

Only available on selected models.

Outline Drawings

All dimensions are shown in mm and are nominal unless otherwise stated.

Marking

Where space is limited some or all of the information will be omitted/truncated at our discretion. Full product description will be found on the individual batch packaging.

Ordering Information

Refer to individual data sheets.