Specifying TCXOs

Temperature Compensated Crystal Oscillators (TCXOs) give much tighter frequency stabilities than standard clock oscillators. The frequency over temperature change for a temperature compensated oscillator is internally monitored and compensated for using a similar process to that used inside a VCXO. As a result, the frequency change seen on the output is significantly reduced. Some temperature compensated voltage controlled crystal oscillators also give a further fine tuning function to allow the customer to make changes to the output frequency while the circuit is active.

We use the code TCXO to denote our Temperature Compensated Crystal Oscillator part numbers and the code TVXO to denote our Voltage Controlled Temperature Compensated Crystal Oscillators with additional voltage control function within our part numbers.

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

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

A typical TCXO specification reads like this:

19.2MHz IQXT-191-6 Clipped Sine ±2.5ppm

-30 to 85°C 3.3V ±5ppm min

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

- Frequency
- Model
- Output
- Frequency Stability
- Operating Temperature Range
- Supply Voltage
- Frequency Adjustment (pulling)

The following notes define each element of the specification.

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 frequency should be specified 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.

Model

The model incorporates information which describes output compatibility, holder style and supply voltage.

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Frequency Stability

The frequency stability is the frequency change over the operating temperature range.

In tight tolerance applications, it may be necessary to apply a frequency offset at 25°C in order to centralise the frequency/temperature characteristic to the nominal frequency. If applicable this will be stated in the individual data sheet.
The following are common frequency stabilities:

±0.05ppm
±0.28ppm
±0.5ppm
±0.9ppm
±1.0ppm
±2.5ppm
±50ppb

Operating Temperature Ranges

Although in general these devices will continue to operate outside their normal temperature range with a degradation in frequency stability, permanent damage may result if the temperature is excessive to that mentioned in the data sheet.

The following are common operating temperature ranges:

-30 to 85°C
-40 to 85°C
-40 to 105°C

Frequency Adjustment

In order to meet their specification over their full operating temperature range, close tolerance devices are often adjusted to have a frequency offset at room temperature, therefore adjustment of the mechanical trimmers of such devices should not be attempted unless facilities exist to measure their frequency over their full operating temperature range.

Additional Text Code

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.

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 information may be omitted or truncated at our discretion. Full product description will be found on the individual batch packaging.

Ordering Information

See individual data sheets.

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