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GB/T 22319.9-2018

Measurement of quartz crystal unit parameters -- Part 9: Measurement of spurious resonances of piezoelectric crystal units

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Table of Contents

Foreword

GB/T 22319 "Measurement of Quartz Crystal Element Parameters" is divided into the following parts.

--- Part 1. Basic method for measuring the resonant frequency and resonant resistance of a quartz crystal element using the pi-network zero-phase method;

--- Part 2. The phase offset method for measuring the dynamic capacitance of a quartz crystal element;

---Part 4. Measurement methods for load resonance frequency and load resonance resistance RL for quartz crystal elements with frequency up to 30 MHz and others

The calculation of the derived parameter;

--- Part 5. Methods for determining equivalent electrical parameters using automatic network analysis techniques and error correction;

--- Part 6. Measurement of stimulus level correlation (DLD);

--- Part 7. Measurement of the activity jump of quartz crystal elements;

--- Part 8. Measurement fixtures for surface mounted quartz crystal components;

--- Part 9. Measurement of spurious resonance of a quartz crystal element;

---Part 11. Standard for Determining Load Resonance Frequency and Equivalent Load Capacitance Using Automatic Network Analysis Technique and Error Correction

method.

This part is Part 9 of GB/T 22319.

This section was drafted in accordance with the rules given in GB/T 1.1-2009.

This section uses the translation method equivalent to the use of IEC 60444-9.2007 "Quartz crystal element parameters measurement - Part 9. Quartz crystal element

Parasitic resonance measurement."

This section made the following editorial changes.

--- Chapter 1 Paragraph 1 "This part improves and improves the reproducibility and accuracy of measurement compared to earlier methods." and below

In the bridge measurement method specified in the "Early Quartz Resonator Response Measurement Method", a method that cannot meet reproducibility requirements was used.

Components such as variable resistors and hybrid transformers. "Instead of a note, and removed the following"

Is no longer on sale";

--- The last "method of method B in Chapter 1 is an improvement of the "baseline method" in the early standard." Instead, it is given in the form of a note;

---3.1.1c) Chinese (14) The following "if the amplitude of these two data points are greater than Qmax" is replaced by "if the amplitude of these two data points are large

In Qmin".

1 Scope

This part of GB/T 22319 specifies two methods of measuring the parasitic (useless) resonance of a quartz crystal element.

Note. Compared with earlier methods, this part improves and improves the reproducibility and accuracy of the measurement. In the early prescribed method of bridge measurement, the use of a

Components that require reproducibility, such as variable resistors and hybrid transformers.

Method A (all parameter measurement method)

The parametric measurement method can determine the equivalent electrical parameters of the spurious resonance. This method uses a measuring device with the same principle as IEC 60444-5.

This method is a preferred measurement method that can be used to measure low-to-medium impedance parasitic resonances up to several thousand ohms.

Method B (resistance measurement method)

Resistance measurements should be used to measure high-impedance spurious resonances as specified, such as certain filtered crystals. This method uses method A

The same measuring equipment is connected with the specified test fixture, which is composed of commercially available microwave components, such as having an accurate 50ohm

System impedance of 180° hybrid coupler and 10dB attenuator.

Note. This method is an improvement over the "benchmarking method" used in earlier standards.

2 Overview

Quartz crystal elements can exhibit multiple resonances, which can be represented in parallel with multiple series resonant circuits. Complete quartz crystal element single-ended

The equivalent circuit is shown in Figure 1 (derived from IEC 60444-5).

Figure 1 Multi-resonant single-ended equivalent circuit

Therefore, the total admittance Ytot of the equivalent circuit of n resonances is expressed by Equation (1) as.

Ytot=G0 jomegaC0 sum

Yi (1)

In the formula.

Ytot --- total admittance of the equivalent circuit, the unit is Siemens (S);