INTERNATIONAL STANDARD

IEC 60444-8

First edition
2003-07

Measurement of quartz crystal unit parameters –

Part 8: Test fixture for surface mounted quartz crystal units

Mesure des paramètres des résonateurs à quartz –

Partie 8:
Dispositif d'essai pour les résonateurs à quartz montés en surface

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE L

For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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MEASUREMENT OF QUARTZ CRYSTAL UNIT PARAMETERS –

Part 8: Test fixture for surface mounted quartz crystal units

FOREWORD

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International Standard IEC 60444-8 has been prepared by IEC technical committee 49: Piezoelectric and dielectric devices for frequency control and selection.

This International Standard cancels and replaces IEC/PAS 62277 published in 2001, of which it constitutes a technical revision.

The text of this standard is based on the following documents:

FDIS	Report on voting
49/599/FDIS	49/611/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This standard forms Part 8 of a series of publications dealing with measurements of quartz crystal unit parameters.

IEC 60444 consists of the following parts under the general title *Measurement of quartz crystal unit parameters:*

Part 1: Basic method for the measurement of resonance frequency and resonance resistance of quartz crystal units by zero phase technique in a π-network

Part 2: Phase offset method for measurement of motional capacitance of quartz crystal units

Part 4: Method for the measurement of the load resonance frequency f_L, load resonance resistance, R_L and the calculation of other derived values of quartz crystal units, up to 30 MHz

Part 5: Methods for the determination of equivalent electrical parameters using automatic network analyzer techniques and error correction

Part 6: Measurement of drive level dependence (DLD)

Part 7: Measurement of activity and frequency dips of quartz crystal units[1]

The committee has decided that the contents of this publication will remain unchanged until 2007. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

A bilingual version of this standard may be issued at a later date.

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1 Under consideration.

INTRODUCTION

This document is only for the test fixture applied to leadless surface mounted quartz crystal units. The document is the specification for the test fixture [1][2] that allows the accurate measurement of resonance frequency, resonance resistance, and equivalent electrical circuit parameters of leadless surface mounted quartz crystal units. The measurement method using an automatic network analyzer is based on IEC 60444-5.

The measuring frequency range is from 1 MHz to 150 MHz when the load capacitance is not used, and is from 1 MHz to 30 MHz when the load capacitance is used. The use of the test fixture with the measurement method yields measurement accuracy of about 10^{-6} over of the frequency range, and the accuracy of the resonance resistance is ±2 Ω or ±10 %.

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2 Numbers in square brackets refer to the bibliography.

MEASUREMENT OF QUARTZ CRYSTAL UNIT PARAMETERS –

Part 8: Test fixture for surface mounted quartz crystal units

1 Scope

This part of IEC 60444 explains the test fixture that allows the accurate measurement of resonance frequency, resonance resistance, and equivalent electrical circuit parameters of a leadless surface mounted quartz crystal units using zero phase technique as specified in IEC 60444-4 and IEC 60444-5.

An equivalent circuit constant and the application frequency range obtained by using the test fixture are then shown.

In addition, this is applied to the enclosure shown in IEC 61240 as a crystal unit without lead wires. An equivalent circuit of the test fixture and an electric values are based on IEC 60444-1 and IEC 60444-4. The range of load capacitance is 10 pF or more. Calibration of the measurement system and C_L adapter board is explained hereafter.

This document applies to the test fixture that allows the accurate measurement of resonance frequency, resonance resistance, parallel capacitance C_0, motional capacitance C_1, and motional inductance L_1 of the crystal unit over the frequency range from 1 MHz to 150 MHz using an automatic network analyzer, based on IEC 60444-5.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60444-1:1986, *Measurement of quartz crystal unit parameters by zero phase technique in a pi-network. Part 1: Basic method for the measurement of resonance frequency and resonance resistance of quartz crystal units by zero phase technique in a pi-network*

IEC 60444-2:1980, *Measurement of quartz crystal unit parameters by zero phase technique in a pi-network. Part 2: Phase offset method for measurement of motional capacitance of quartz crystal units*

IEC 60444-5:1995, *Measurement of quartz crystal units parameters – Part 5: Methods for the determination of equivalent electrical parameters using automatic network analyzer techniques and error correction*

IEC 61240:1994, *Piezoelectric devices – Preparation of outline drawings of surface-mounted devices (SMD) for frequency control and selection – General rules*