



IEC 62024-1

Edition 3.0 2017-12

INTERNATIONAL STANDARD

**High frequency inductive components – Electrical characteristics and measuring methods –
Part 1: Nanohenry range chip inductor**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.100.10

ISBN 978-2-8322-5167-6

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 Inductance, Q-factor and impedance	6
4.1 Inductance	6
4.1.1 Measuring method	6
4.1.2 Measuring circuit	6
4.1.3 Mounting the inductor for the test	7
4.1.4 Measuring method and calculation formula	8
4.1.5 Notes on measurement.....	9
4.2 Quality factor	10
4.2.1 Measuring method	10
4.2.2 Measuring circuit	10
4.2.3 Mounting the inductor for test	10
4.2.4 Measuring methods and calculation formula	10
4.2.5 Notes on measurement.....	11
4.3 Impedance	11
4.3.1 Measuring method	11
4.3.2 Measuring circuit	11
4.3.3 Mounting the inductor for test	11
4.3.4 Measuring method and calculation.....	11
4.3.5 Notes on measurement.....	11
5 Resonance frequency	12
5.1 Self-resonance frequency	12
5.2 Minimum output method	12
5.2.1 General	12
5.2.2 Measuring circuit	12
5.2.3 Mounting the inductor for test	12
5.2.4 Measuring method and calculation formula	13
5.2.5 Note on measurement	13
5.3 Reflection method.....	13
5.3.1 General	13
5.3.2 Measuring circuit	14
5.3.3 Mounting the inductor for test	14
5.3.4 Measuring method	15
5.3.5 Notes on measurement.....	15
5.4 Measurement by analyser	16
5.4.1 Measurement by impedance analyser	16
5.4.2 Measurement by network analyser.....	16
6 DC resistance.....	16
6.1 Voltage-drop method.....	16
6.1.1 Measuring circuit	16
6.1.2 Measuring method and calculation formula	17
6.2 Bridge method	17
6.2.1 Measuring circuit	17

6.2.2	Measuring method and calculation formula	17
6.3	Notes on measurement	18
6.4	Measuring temperature	18
Annex A	(normative) Mounting method for a surface mounting coil	19
A.1	Overview	19
A.2	Mounting printed-circuit board and mounting land	19
A.3	Solder	19
A.4	Preparation	19
A.5	Pre-heating	19
A.6	Soldering	19
A.7	Cleaning	19
Figure 1	– Example of circuit for vector voltage/current method	7
Figure 2	– Fixture A	7
Figure 3	– Fixture B	8
Figure 4	– Short device shape	10
Figure 5	– Example of test circuit for the minimum output method	12
Figure 6	– Self-resonance frequency test board (minimum output method)	13
Figure 7	– Example of test circuit for the reflection method	14
Figure 8	– Self-resonance frequency test board (reflection method)	15
Figure 9	– Suitable test fixture for measuring self-resonance frequency	16
Figure 10	– Example of test circuit for voltage-drop method	17
Figure 11	– Example of test circuit for bridge method	18
Table 1	– Dimensions of l and d	8
Table 2	– Short device dimensions and inductances	10

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HIGH FREQUENCY INDUCTIVE COMPONENTS – ELECTRICAL CHARACTERISTICS AND MEASURING METHODS –

Part 1: Nanohenry range chip inductor

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62024-1 has been prepared by IEC technical committee 51: Magnetic components, ferrite and magnetic powder materials.

This third edition cancels and replaces the second edition published in 2008. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) addition of voltage-drop method of DC resistance measuring;
- b) unification of technical terms.

The text of this International Standard is based on the following documents:

CDV	Report on voting
51/1187/CDV	51/1202/RVC

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

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

A list of all parts of the IEC 62024 series, published under the general title *High frequency inductive components – Electrical characteristics and measuring methods*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

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

HIGH FREQUENCY INDUCTIVE COMPONENTS – ELECTRICAL CHARACTERISTICS AND MEASURING METHODS –

Part 1: Nanohenry range chip inductor

1 Scope

This part of IEC 62024 specifies electrical characteristics and measuring methods for the nanohenry range chip inductor that is normally used in high frequency (over 100 kHz) range.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 61249-2-7, *Materials for printed boards and other interconnecting structures – Part 2-7: Reinforced base materials clad and unclad – Epoxide woven E-glass laminated sheet of defined flammability (vertical burning test) copper-clad*

IEC 62025-1, *High frequency inductive components – Non-electrical characteristics and measuring methods – Part 1: Fixed, surface mounted inductors for use in electronic and telecommunication equipment*

ISO 6353-3, *Reagents for chemical analysis – Part 3: Specifications – Second series*

ISO 9453, *Soft solder alloys – Chemical compositions and forms*