

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

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**Ferrite cores – Guidelines on dimensions and the limits of  
surface irregularities –  
Part 9: Planar-cores**

**Noyaux ferrites – Lignes directrices relatives aux dimensions  
et aux limites des irrégularités de surface –  
Partie 9: Noyaux planaires**



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## FERRITE CORES – GUIDELINES ON DIMENSIONS AND THE LIMITS OF SURFACE IRREGULARITIES –

### Part 9: Planar-cores

#### FOREWORD

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International Standard IEC 63093-9 has been prepared by IEC technical committee 51: Magnetic components, ferrite and magnetic powder materials.

This first edition cancels and replaces the first edition of IEC 60424-5 published in 2009 and first edition of IEC 62317-9 published in 2006 and its Amendment 1:2007. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous editions of IEC 60424-5 and IEC 62317-9:

- a) IEC 63093-9 integrates IEC 60424-5 and IEC 62317-9;
- b) Table 1, Table 2 and Table 3 in IEC 60424-5:2009 have been moved to Annex B;
- c) some numbers are corrected in Table 4;
- d) Table 6 is amended following IEC 60205.

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

CDV	Report on voting
51/1308/CDV	51/1326/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 in the IEC 63093 series, published under the general title *Ferrite cores – Guidelines on dimensions and the limits of surface irregularities*, 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- withdrawn,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.

## INTRODUCTION

Today, DC-to-DC converter power supplies increasingly employ transformers and chokes, the windings of which are made of multi-layer printed circuit boards or are constructed in the motherboard, rather than the transformers wound by conventional copper wires. This document specifies the optimum shapes and dimensions of cores for surface mounted devices (SMDs) and of cores for which the windings are constructed in the motherboard. The motherboard has slots cut out to accept the ferrite cores. This is called the total integration in a multi-layer motherboard. The core shape specified in this document satisfies the demand for lower profile as well as for smaller floor space.

The relations between the main dimensions of planar E-, ER- and EL-cores differ from those of standard cores. For example, the width of planar-cores is larger while the total height is much smaller. Also the thickness of the legs is in most cases smaller than compared to standard cores. Therefore the concept of fixed reference dimensions to determine the length of crack limits yields crack lengths which are not acceptable for this type of core. This document follows another concept which relates the crack length to dimensions of the surface on which the crack occurs.

Also the concept to determine the maximum area of chips based on the total mating surface fails in the case of planar-cores. The outer legs of planar-cores are much thinner than those of standard cores which makes overlapping and gluing much more difficult. A single chip of maximum size on the outer leg can affect the functionality of the core set. Therefore this document uses as a reference the mating surface on which the chip occurs.

Windings of planar-cores are often PCBs which are glued to the inner surfaces of the planar-core. For this reason the inner surfaces of the planar-cores should have a better quality than the inner surfaces of standard cores. This was taken into account by reducing the maximum allowable area of pull-outs in the inner surfaces.

# FERRITE CORES – GUIDELINES ON DIMENSIONS AND THE LIMITS OF SURFACE IRREGULARITIES –

## Part 9: Planar-cores

### 1 Scope

This part of IEC 63093 specifies the shapes and dimensions of ferrite cores for inductive components (transformers and chokes), whose the coil is typically made of multi-layer boards (or the coil is part of the motherboard), and the effective parameter values used in calculations. This document gives guidelines on allowable limits of surface irregularities applicable to planar-cores as well.

This document is considered as a sectional specification useful in the negotiation between ferrite core suppliers and users about surface irregularities.

The general consideration upon which the design of this range of cores is based is given in Annex A.

### 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 60205:2016, *Calculation of the effective parameters of magnetic piece parts*

IEC 60401-1, *Terms and nomenclature for cores made of magnetically soft ferrites – Part 1: Terms used for physical irregularities*

IEC 60424-1, *Ferrite cores – Guidelines on the limits of surface irregularities – Part 1: General specification*

### 3 Terms and definitions

For the purpose of this document, the terms and definitions given in IEC 60401-1 and IEC 60424-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 4 Primary dimensions

#### 4.1 Planar shapes and dimensions

The main shapes and dimensions shall be as given in the following figures and tables.

The main shapes, dimensions, and parameters for EL-cores are given in: