

INTERNATIONAL STANDARD

Miniature fuses –
Part 8: Fuse resistors with particular overcurrent protection

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MINIATURE FUSES –**Part 8: Fuse resistors with particular
overcurrent protection**

FOREWORD

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International Standard IEC 60127-8 has been prepared by subcommittee SC 32C: Miniature fuses, of IEC technical committee 32: Fuses

This first edition of IEC 60127-8 cancels and replaces IEC PAS 60127-8:2014.

This international standard is to be used in conjunction with IEC 60127-1.

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

FDIS	Report on voting
32C/542/FDIS	32C/546/RVD

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 60127 series, published under the general title *Miniature fuses*, 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- withdrawn,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.

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INTRODUCTION

In recent years, so-called “fuse resistors” have increasingly been used in electrical and electronic applications. The term “fuse resistor”, however, which has become established in the market, is misleading. The actual function of a fuse resistor is that of a resistor in an electrical or electronic circuit. Only when an overload of multiple times the rated dissipation occurs can fuse resistors interrupt an electric current. In a wide range between the rated dissipation and the manufacturer’s specified breaking dissipation, fuse resistors provide poor or no overcurrent protection. Therefore if they are incorrectly rated and improperly used in an application, this may result in potential risk of fire.

Fuse resistors perform the function of a fuse only within a particular overcurrent range, and, from a technical point of view, must therefore be referred to as “fuse resistors with particular overcurrent protection”.

Fuse resistors with particular overcurrent protection can safely interrupt high short-circuit currents, but are not capable of interrupting overload currents.

For safety reasons, they are only used in combination with an accompanying overload current protection device, if overload currents cannot be excluded to occur in the respective application.

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MINIATURE FUSES –

Part 8: Fuse resistors with particular overcurrent protection

1 Scope

This part of IEC 60127 relates to fuse resistors with particular overcurrent protection rated up to AC 500 V and/or DC 500 V for printed circuits and other substrate systems, used for the protection of electric appliances, electronic equipment and component parts thereof, normally intended to be used indoors.

It does not apply to fuse resistors with particular overcurrent protection for appliances intended to be used under special conditions, such as in a corrosive or explosive atmosphere.

The object of this part of IEC 60127 is

- a) to establish uniform requirements for fuse resistors with particular overcurrent protection so as to protect appliances or parts of appliances in the most suitable way;
- b) to define the performance of the fuse resistors with particular overcurrent protection, so as to give guidance to manufacturers of electrical appliances and electronic equipment and to ensure replacement of fuse resistors with particular overcurrent protection by those of similar dimensions and characteristics;
- c) to establish uniform test methods for fuse resistors with particular overcurrent protection, so as to allow verification of the values (for example rated dissipation, functioning characteristic and rated breaking capacity values) specified by the manufacturer.

Manufacturers of fuse resistors with particular overcurrent protection shall ensure on their own responsibility that their products comply with the requirements of the resistor-related standards IEC 60115-1, IEC 60115-4-101 and IEC 60115-4-102¹.

This part of IEC 60127 applies in addition to the requirements of IEC 60127-1.

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 60063:2015, *Preferred number series for resistors and capacitors*

IEC 60068-2-21:2006, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60115-1:2008, *Fixed resistors for use in electronic equipment – Part 1: Generic specification*

¹ This standard has been withdrawn.

IEC 60115-4-101:1995, *Fixed resistors for use in electronic equipment – Part 4: Detail specification: Fixed power wirewound resistors with solderable axial wire leads – Stability class 5%. Assessment level E*

IEC 60115-4-102:1995, *Fixed resistors for use in electronic equipment – Part 4: Detail specification: Fixed power wirewound resistors with solderable axial wire leads – Stability class 1 % – Assessment level E*

IEC 60127-1:2006, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links*

IEC 60127-1:2006/AMD1:2011

IEC 60127-1:2006/AMD2:2015

IEC 60194:2015, *Printed board design, manufacture and assembly – Terms and definitions*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60695-2-12:2010, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60695-2-13:2010, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignition temperature (GWIT) test method for materials*

IEC 60695-4:2012, *Fire hazard testing – Part 4: Terminology concerning fire tests for electrotechnical products*

IEC 61249-2-7:2002, *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*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in Clause 3 of IEC 60127-1:2006 as well as IEC 60115-1, IEC 60115-4-101 and IEC 60115-4-102 and the following 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>

3.1

fuse resistor with particular overcurrent protection

resistor with the added function of a fuse, characterized as being capable of continuously carrying currents up to at least the rated dissipation and of interrupting currents above a defined multiple of the rated dissipation up to its rated breaking capacity

Note 1 to entry: Fuse resistors with particular overcurrent protection can safely interrupt high short-circuit currents, but are not capable of interrupting overload currents. They are therefore allowed to be used only in combination with an accompanying overload current protection device such as a miniature fuse according to parts 2, 3, 4 and 7, if overload currents cannot be excluded to occur in the respective application.

3.2

fuse resistor with particular overcurrent protection for through-hole mounting

fuse resistor with particular overcurrent protection designed for soldering directly into a printed wiring board, with insertion of its leads in suitably designed holes

3.3

fuse resistor with particular overcurrent protection for surface mounting

fuse resistor with particular overcurrent protection designed for direct conductive attachment by solder or other means onto the surface of a substrate, without insertion of its leads in suitably designed holes or sockets

3.4

land

portion of a conductive pattern usually but not exclusively used for the connection and/or attachment of components

SEE: IEC 60194

Note 1 to entry: Further definitions which may be useful in the application of surface-mount fuse resistors with particular overcurrent protection may be found in IEC 60115-1 and IEC 60115-8.

3.5

critical resistance

resistance value at which the rated voltage is equal to the limiting element voltage

Note 1 to entry: At an ambient temperature of 70 °C, the maximum voltage which may be applied across the terminations of a fuse resistor with particular overcurrent protection is either the calculated rated voltage, if the resistance is less than the critical resistance, or the limiting element voltage, if the resistance is equal to or greater than the critical resistance. At temperatures other than 70 °C, it is important that account be taken of the derating curve and of the limiting element voltage in the calculation of any voltage to be applied

Note 2 to entry: Related terminology: Rated voltage, limiting element voltage.

3.6

limiting element voltage

U_{\max}

maximum DC or AC r.m.s. voltage that may be continuously applied to the terminations of a fuse resistor with particular overcurrent protection (generally dependent upon size and manufacturing technology of the fuse resistor with particular overcurrent protection)

Note 1 to entry: Where the term "AC r.m.s. voltage" is used in this standard, the peak voltage should not exceed 1,42 times the r.m.s. value.

Note 2 to entry: This voltage can only be applied to fuse resistors with particular overcurrent protection when the resistance value is equal to or higher than the critical resistance value.

Note 3 to entry: Related terminology: rated voltage, critical resistance.

3.7

rated resistance

resistance value for which the fuse resistor with particular overcurrent protection has been designed, and which is generally used for denomination of the fuse resistor with particular overcurrent protection

3.8

rated dissipation

P_{70}

maximum permissible dissipation at an ambient temperature of 70 °C under the conditions of the respective acceptance criteria

Note 1 to entry: If the rated dissipation depends on special means supporting the abduction of the dissipation to the environment, for example, special circuit board material, special conductor dimensions, heat-sink, such means have to be identified whenever the rated dissipation is mentioned.

Note 2 to entry: Related terminology: rated temperature, rated voltage.