

PUBLICLY AVAILABLE SPECIFICATION

PRE-STANDARD

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

iTen Standards
(<https://standards.iten.ai>)
Document Preview

IEC PAS 60127-8:2014

<https://standards.iten.ai/catalog/standards/iec/798643df-3cb6-43ce-873e-b59d3ab6a042/iec-pas-60127-8-2014>

WITHDRAWN



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2014 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 14 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 55 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

PUBLICLY AVAILABLE SPECIFICATION PRE-STANDARD

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

iTen Standards
(<https://standards.iten.ai>)
Document Preview

<https://standards.iten.ai/catalog/standard/iec/798643df-3cb6-43ce-873e-b59d3ab6a042/iec-pas-60127-8-2014>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

T

ICS 29.120.50

ISBN 978-2-8322-1982-9

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

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 General requirements	10
5 Standard ratings	10
6 Marking	10
7 General notes on tests	11
7.1 Atmospheric conditions for testing	11
7.2 Type tests.....	11
7.3 Fuse-bases for tests	12
7.3.1 General requirements	12
7.3.2 Through-hole mounting of fuse resistors with particular overcurrent protection	12
7.3.3 Surface mounting of fuse resistors with particular overcurrent protection	12
7.4 Nature of supply	12
8 Dimensions and construction	12
8.1 Dimensions	12
8.1.1 Creepage distances and clearances	13
8.2 Construction	13
8.3 Terminations.....	14
8.3.1 Through-hole mount fuse resistors with particular overcurrent protection	14
8.3.2 Surface mount fuse resistors with particular overcurrent protection	14
8.4 Alignment and configuration of terminations.....	14
8.5 Soldered joints.....	15
8.6 Solderability of terminations.....	15
8.7 Resistance to soldering heat.....	15
9 Electrical requirements	15
9.1 Resistance value	15
9.2 Functioning characteristic at the minimum breaking dissipation.....	15
9.2.1 Functioning characteristic at an ambient temperature of 70 °C	15
9.2.2 Test at elevated temperature	16
9.2.3 Test procedure	16
9.2.4 Presentation of results.....	16
9.3 Rated breaking capacity.....	16
9.3.2 Criteria for satisfactory performance	17
9.3.3 Insulation resistance.....	17
9.4 Endurance tests.....	17
9.5 Maximum sustained dissipation.....	18
9.6 Pulse tests.....	18
9.7 Temperature of fuse resistors with particular overcurrent protection.....	18
9.8 Operating overvoltage.....	18
Bibliography.....	25

Figure 1 – Test board for through-hole mount fuse resistors with particular overcurrent protection	20
Figure 2 – Test board for surface mount fuse resistors with particular overcurrent protection	21
Figure 3 – Test fuse-base	22
Figure 4 – Bending jig for surface mount fuse resistors with particular overcurrent protection	23
Figure 5 – Test circuit for the tests according to 9.3.....	24
Table 1 – Creepage distances and clearances (absolute minimum values)	13
Table 2 – Test voltages for dielectric strength.....	17
Table 3 – Testing schedule for individual dissipation ratings	19

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

IEC PAS 60127-8:2014

<https://standards.iteh.ai/catalog/standards/iec/798643df-3cb6-43ce-873e-b59d3ab6a042/iec-pas-60127-8-2014>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MINIATURE FUSES –

Part 8: Fuse resistors with particular overcurrent protection

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.

A PAS is a technical specification not fulfilling the requirements for a standard, but made available to the public.

IEC PAS 60127-8 has been processed by subcommittee 32C: Miniature fuses, of IEC technical committee 32: Fuses.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
32C/500/PAS	32C/503/RVD

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

A list of all parts in the IEC 60127, published under the general title *Miniature fuses*, can be found on the IEC website.

This PAS shall remain valid for an initial maximum period of 3 years starting from the publication date. The validity may be extended for a single period up to a maximum of 3 years, at the end of which it shall be published as another type of normative document, or shall be withdrawn.

Withdrawn

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

<https://standards.iteh.ai/catalog/standards/iec/7986/3df-3cb6-43ce-873e-b59d3ab6a042/iec-pas-60127-8-2014>

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. So 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 shall therefore only be used in combination with an accompanying overload current protection device, i.e. a true fuse, if overload currents cannot be excluded to occur in the respective application.

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

IEC PAS 60127-8:2014

<https://standards.iteh.ai/catalog/standards/iec/7986/3df-3cb6-43ce-873e-b59d3ab6a042/iec-pas-60127-8-2014>

Withhold

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 500 V a.c. and/or 500 V d.c. 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 PAS 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 define methods of testing.

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

NOTE Manufacturers of fuse resistors with particular overcurrent protection must 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 60115-4-102 (withdrawn).

The object of this PAS is 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.

2 Normative references

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

IEC 60063:1963, *Preferred number series for resistors and capacitors*
Amendment 1:1967
Amendment 2:1977

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

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

IEC 60194:2006, *Printed board design, manufacture and assembly – Terms and definitions*

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*

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 the following apply.

3.28

fuse resistor with particular overcurrent protection

fuse resistor capable of continuously carrying currents up to at least the rated power 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, if overload currents cannot be excluded to occur in the respective application.

3.29

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

3.30

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

3.31

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.

3.32

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.

3.33**limiting element voltage** U_{\max}

maximum d.c. or a.c. 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 "a.c. 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.

3.34**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

3.35**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.

3.36**rated temperature**

maximum ambient temperature at which the rated dissipation may be applied continuously

Note 1 to entry: The rated temperature has a value of 70 °C, unless otherwise prescribed in the relevant sectional specification.

Note 2 to entry: Related terminology: rated dissipation.

3.37**rated voltage of the fuse resistor with particular overcurrent protection** U_r

d.c. or a.c. r.m.s. voltage calculated from the square root of the product of the rated resistance and the rated dissipation

Note 1 to entry: At high values of resistance, the rated voltage may not be applicable because of the size and the construction of the fuse resistor with particular overcurrent protection.

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

3.38**minimum breaking dissipation**

minimum value of the breaking dissipation which is equal to a multiple of the rated dissipation and at which the fuse resistor with particular overcurrent protection can still safely interrupt the circuit

Note 1 to entry: In this standard the minimum breaking dissipation is specified to be 16 times the rated dissipation. This value corresponds to the values given by most of the manufacturers.