

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Fixed resistors for use in electronic equipment –  
Part 8: Sectional specification: Fixed surface mount resistors**

**Résistances fixes utilisées dans les équipements électroniques –  
Partie 8: Spécification intermédiaire: Résistances fixes pour montage en surface**

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IEC 60115-8 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment. It is an International Standard.

This third edition cancels and replaces the second edition published in 2009. This edition constitutes a technical revision.

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

- a) definitions of product technologies and product classification levels of the generic specification, IEC 60115 1:2020, have been adopted;
- b) new style of transverse (RT) resistors has been added in 3.1.5 and 4.2.2 to cover resistors with wide terminals, which have become common in market;
- c) recommended test boards in 5.2.2 have been revised to fit the demands from the market for higher rated dissipation in resistors;

- d) test boards have been revised so that they can be set vertically instead of horizontally during specified tests to optimize the temperature rise stability, area and spacing inside the test chamber;
- e) 'Periodic-pulse high-voltage overload test' of IEC 60115-1:2020, 8.3 has been added to the default test method in 5.3.8, however, the legacy test 'periodic-pulse overload test' of IEC 60115-1:2020, 8.4 is still maintained for historical products;
- f) revised solderability test of IEC 60115-1:2020, 11.1 has been adopted in 5.3.21 and 5.3.22;
- g) combined solvent resistance test of IEC 60115-1:2020, 11.3 has been adopted in 5.3.24;
- h) 'Single-pulse high-voltage overload test' of IEC 60115-1:2020, 8.2, applied with the pulse shape 10/700 in 5.3.7, is complemented with the optional alternative provided by the pulse shape 1,2/50 in 5.4.1;
- i) climatic tests for 'operation at low temperature' of IEC 60115-1:2020, 10.2, and for 'damp heat, steady state, accelerated' of IEC 60115-1:2020, 10.5, have been adopted as optional tests in 5.4.3 and 5.4.4, respectively;
- j) new guidance is provided in 6.2 on the presentation of stability requirements with their permissible absolute and relative deviations;
- k) acceptance criteria for the visual examination have been added in 6.5 and in Annex B;
- l) visual examination for the primary and proximity packaging has been added in 6.5.3 and in 7.2;
- m) periodical evaluation of termination plating has been added as a new topic of quality assessment in 9.8;
- n) revised test clause numbering of IEC 60115-1:2020 has been applied;
- o) normative Annex A has been moved from Annex B of the old version to stay in line with other sectional specifications;
- p) normative Annex B has been added to show the criteria for general visual examinations;
- q) informative Annex C has been added to summarize workmanship requirements for the assembly;
- r) normative Annex D has been moved from Annex A of the old version to stay in line with other sectional specifications;
- s) informative Annex E has been added to show guidance for optional and/or additional tests;
- t) informative Annex F has been added to show typical temperature rise of recommended test boards in the endurance test at the rated temperature 70 °C;
- u) informative Annex G has been added to explain why some recommended test boards have extremely wide copper patterns;
- v) informative Annex X has been added to show the cross reference for the prior revision of this document.

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

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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## FIXED RESISTORS FOR USE IN ELECTRONIC EQUIPMENT –

### Part 8: Sectional specification: Fixed surface mount resistors

#### 1 Scope

This part of IEC 60115 is applicable to fixed surface mount resistors for use in electronic equipment.

These resistors are typically described according to types (different geometric shapes) and styles (different dimensions) and product technology. These resistors have metallized terminations and are primarily intended to be mounted directly onto a circuit board.

The object of this document is to specify preferred ratings and characteristics and to select from IEC 60115-1, the appropriate quality assessment procedures, tests and measuring methods and to give general performance requirements for this type of resistor.

#### 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 60062:2016, *Marking codes for resistors and capacitors*

[https://standards.iteh.ai/catalog/standards/sist/b169a4b9-d483-483e-af8b-e509f869968b/iec-](https://standards.iteh.ai/catalog/standards/sist/b169a4b9-d483-483e-af8b-e509f869968b/iec-60068-1-2013)  
IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-6:2007, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-58:2015, *Environmental testing – Part 2-58: Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)*

IEC 60115-1:2020, *Fixed resistors for use in electronic equipment – Part 1: Generic specification*

IEC 60286-3, *Packaging of components for automatic handling – Part 3: Packaging of surface mount components on continuous tapes*

IEC 61193-2:2007, *Quality assessment systems – Part 2: Selection and use of sampling plans for inspection of electronic components and packages*

IEC 61760-1:2020, *Surface mounting technology – Part 1: Standard method for the specification of surface mounting components (SMDs)*

IEC 60294:2012, *Measurement of the dimensions of a cylindrical component with axial terminations*

### 3 Terms, definitions, product technologies and product classification

#### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60115-1:2020, 3.1 and the following apply.

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

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

##### 3.1.1

##### **cylindrical (RC) resistor**

physical design of a component with metallic terminations to both sides along the longitudinal axis of the cylindrical component body

Note 1 to entry: This series of products is generally called MELF. However, MELF resistors are different and not related to MELF diodes.

##### 3.1.2

##### **load reduction curve**

curve that shows the maximum allowable dissipation at terminal part temperatures between the upper and lower category temperatures

##### 3.1.3

##### **rectangular (RR) resistor**

physical design of a component with metallic terminations to both sides along the longitudinal axis of the rectangular component body

##### 3.1.4

##### **terminal part temperature**

$\theta_t$

temperature that is measured on the terminal part, or the connection part of the resistor that is generally soldered to the printed circuit board

##### 3.1.5

##### **transverse (RT) resistor**

physical design of a component with metallic terminations to both sides along the lateral axis of the rectangular component body

##### 3.1.6

##### **wire-wound (RW) resistor**

component designed to use wire-wound elements inside the component body whose physical design can vary depending on the required specification

#### 3.2 Product technologies

The definitions of product technologies intend to provide the reader with a guidance on the variety of technologies used for the making of resistors, and to aid their identification

For the purposes of this document, the following product technologies as described in IEC 60115-1:2020, 3.2 apply:

- metal film technology,
- metal glaze technology,
- carbon film technology,

- wire-wound technology,
- metal foil technology,
- metal strip technology.

### 3.3 Product classification

The introduction of a product classification permits the user to select performance requirements according to the conditions of the intended end-use application.

For the purposes of this document, the following product classification levels as defined in IEC 60115-1:2020, 3.4 apply:

- Level G – General electronic equipment,
- Level P – High-performance electronic equipment,
- Level R – High-performance and high-reliable electronic equipment.

## 4 Preferred characteristics

### 4.1 General

The values given in detail specifications shall be selected from the values given in 4.2 to 4.9.

### 4.2 Style and dimensions

#### 4.2.1 Preferred styles and outline dimensions for rectangular (RR) resistors

The shape and dimensions of rectangular resistors is shown in Figure 1, with preferred styles and their respective dimensions given in Table 1. Style designators of rectangular resistors begin with RR.

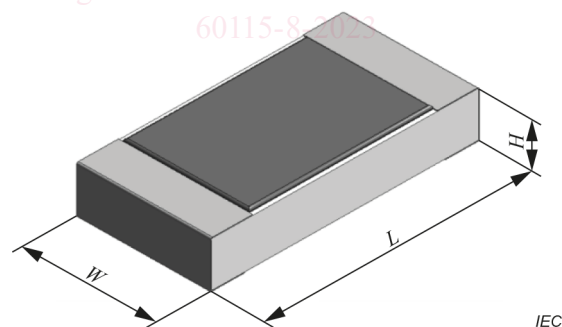


Figure 1 – Shape and dimension of rectangular (RR) resistors