
**Sestavni deli za nizkonapetostne naprave za zaščito pred prenapetostnimi udari -
321. del: Specifikacije za diode s plazovitim prebojem (ABD) (IEC 61643-321:2001)**

Components for low-voltage surge protective devices -- Part 321: Specifications for
Avalanche Breakdown Diode (ABD)

Bauelemente für Überspannungsschutzgeräte für Niederspannung -- Teil 321:
Festlegungen für Avalanche-Dioden (ABD)

Composants pour parafoudres basse tension -- Partie 321: Spécifications pour les
diodes à avalanche (ABD)

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Components for low-voltage surge protective devices
Part 321: Specifications for avalanche breakdown diode (ABD)
(IEC 61643-321:2001)

Composants pour parafoudres
basse tension
Partie 321: Spécifications pour
les diodes à avalanche (ABD)
(CEI 61643-321:2001)

Bauelemente für Überspannungs-
schutzgeräte für Niederspannung
Teil 321: Festlegungen für
Avalanche-Dioden (ABD)
(IEC 61643-321:2001)

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This European Standard was approved by CENELEC on 2002-02-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 37B/59/FDIS, future edition 1 of IEC 61643-321, prepared by SC 37B, Specific components for surge arresters and surge protective devices, of IEC TC 37, Surge arresters, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61643-321 on 2002-02-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2002-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-02-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex ZA is normative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61643-321:2001 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068	Series	Environmental testing	EN 60068	Series
IEC 60364 (mod)	Series	Electrical installations of buildings	HD 384 S2	Series
IEC 60364-3 (mod)	1993	Electrical installations of buildings Part 3: Assessment of general characteristics	HD 384.3 S2	1995
IEC 60721	Series	Classification of environmental conditions	EN 60721	Series
IEC 60747-2	2000	Semiconductor devices - Discrete devices and integrated circuits Part 2: Rectifier diodes	-	-
IEC 60749	1996	Semiconductor devices - Mechanical and climatic test methods	EN 60749	1999

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**Composants pour parafoudres
basse tension –**

**Partie 321:
Spécifications pour les diodes
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protective devices –**

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**Part 321:
Specifications for avalanche
breakdown diode (ABD)**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMPONENTS FOR LOW-VOLTAGE SURGE PROTECTIVE DEVICES –**Part 321: Specifications for avalanche breakdown diode (ABD)**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
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International Standard IEC 61643-321 has been prepared by subcommittee 37B: Specific components for surge arresters and surge protective devices, of IEC technical committee 37: Surge arresters.

The text of this standard is based on the following documents:

FDIS	Report on voting
37B/59/FDIS	37B/62/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

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

COMPONENTS FOR LOW-VOLTAGE SURGE PROTECTIVE DEVICES –

Part 321: Specifications for avalanche breakdown diode (ABD)

1 Scope

This part of IEC 61643 is applicable to avalanche breakdown diodes (ABDs) which represent one type of surge protective device component (hereinafter referred to as SPDC) used in the design and construction of surge protective devices connected to low-voltage power distribution systems, transmission, and signalling networks. Test specifications in this standard are for single ABDs consisting of two terminals. However, multiple ABDs may be assembled within a single package defined as a diode array. Each diode within the array can be tested to this specification.

This standard contains a series of test criteria for determining the electrical characteristics of the ABD. From the standard test methods described herein, the performance characteristics and ratings of the ABD can be verified or established for specific packaged designs.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61643. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61643 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60068 (all parts), *Environmental testing*

IEC 60364 (all parts), *Electrical installations of buildings*

IEC 60364-3:1993, *Electrical installations of buildings – Part 3: Assessment of general characteristics*

IEC 60721 (all parts), *Classification of environmental conditions*

IEC 60747-2:2000, *Semiconductor devices – Discrete devices and integrated circuits – Part 2: Rectifier diodes*

IEC 60749:1996, *Semiconductor devices – Mechanical and climatic test methods*

3 Definitions and symbols

For the purpose of this part of IEC 61643, the following definitions and symbols apply.

NOTE These definitions apply to one type of SPDC known as an ABD, having both symmetrical and asymmetrical voltage-current ($V-I$) characteristics. Such definitions are for a unidirectional element (see figure 1). If the ABD is considered bidirectional, definitions in the third quadrant will apply in both directions of the $V-I$ characteristic curve.

3.1

avalanche breakdown diode ABD

component intended to limit transient voltages and divert surge currents. This is a two-terminal diode that may be packaged with multiple elements having a common terminal

3.2**clamping voltage V_C**

peak voltage measured across the ABD during the application of a peak impulse current I_{PP} for a specified waveform

NOTE Due to the thermal, reactive, or other effects, peak voltage and peak pulse current are not necessarily coincident in time. Also shown as V_{CL} .

3.3**rated peak impulse current I_{PPM}**

rated maximum value of peak impulse current I_{PP} that may be applied without causing diode failure

NOTE The impulse waveshape used for diode characterization is 10/1 000 μ s unless otherwise specified.

3.4**maximum working voltage (maximum d.c. voltage) V_{WM}**

maximum peak working or d.c. voltage which may be continuously applied to the ABD without degradation or damaging effects. For a.c. applied voltages, the maximum working r.m.s. voltage is V_{WMrms}

NOTE It is also shown as V_{RM} (rated maximum) and known as rated stand-off voltage.

3.5**stand-by current I_D**

maximum current that flows through the ABD at maximum working voltage for a specified temperature

NOTE Also shown as I_R for reverse leakage current.

3.6**breakdown (avalanche) voltage V_{BR}**

voltage measured across the ABD at a specified pulsed d.c. current I_T (or I_{BR}) on the V - I characteristics curve at, or near, the place where the avalanche occurs

3.7**capacitance C_j**

capacitance between two terminals of the ABD measured at a specific frequency and bias

NOTE Also shown as C .

3.8**rated peak impulse power dissipation P_{PPM}**

peak pulse power dissipation resulting from the product of rated peak impulse current I_{PPM} and clamping voltage V_C

$$P_{PPM} = I_{PPM} \times V_C$$

NOTE Also shown as P_P .

3.9**rated forward surge current I_{FSM}**

maximum peak current for an 8,3 ms or 10 ms half-sine wave without causing device failure. (This definition applies to unidirectional ABDs only.)