



SLOVENSKI STANDARD
SIST EN 60617-5:1997
01-december-1997

; fU b]g]a Vc`]nUg\ Ya Y!) "XY. Dc`dfYj cXb_]]b`YY_lfcbg_YWj]f197 * \$ * %!
) .% - * Ł

Graphical symbols for diagrams - Part 5: Semiconductors and electron tubes (IEC 60617-5:1996)

Graphische Symbole für Schaltpläne - Teil 5: Schaltzeichen für Halbleiter und Elektronenröhren (IEC 60617-5:1996)

iTeh STANDARD PREVIEW

(standardsite.com)
Symboles graphiques pour schémas - Partie 5: Semiconducteurs et tubes électroniques (CEI 60617-5:1996)

[SIST EN 60617-5:1997](https://standards.iteh.ai/catalog/standards/sist/384b9dbf-bc23-49df-ac81-e24951a70d1c/sist-en-60617-5-1997)

Ta slovenski standard je istoveten z: EN 60617-5:1996

ICS:

01.080.40

29.020

SIST EN 60617-5:1997

en,fr

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60617-5:1997

<https://standards.iteh.ai/catalog/standards/sist/384b9dbf-bc23-49df-ac81-e2455fa70d1c/sist-en-60617-5-1997>

English version

Graphical symbols for diagrams
Part 5: Semiconductors and electron tubes
(IEC 617-5:1996)

Symboles graphiques pour schémas
Partie 5: Semiconducteurs et tubes
électroniques
(CEI 617-5:1996)

Graphische Symbole für Schaltpläne
Teil 5: Schaltzeichen für Halbleiter und
Elektronenröhren
(IEC 617-5:1996)

This European Standard was approved by CENELEC on 1996-03-05. 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 60617-5:1997](https://standards.iteh.ai/catalog/standards/sist/384b9dbf-bc23-49df-ac81-e2455fa70d1c/sist-en-60617-5-1997)

<https://standards.iteh.ai/catalog/standards/sist/384b9dbf-bc23-49df-ac81-e2455fa70d1c/sist-en-60617-5-1997>

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 3A/383/FDIS, future edition 2 of IEC 617-5, prepared by SC 3A, Graphical symbols for diagrams, of IEC TC 3, Documentation and graphical symbols, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60617-5 on 1996-03-05.

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) 1997-03-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 1997-03-01

Endorsement notice

The text of the International Standard IEC 617-5:1996 was approved by CENELEC as a European Standard without any modification.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60617-5:1997

<https://standards.iteh.ai/catalog/standards/sist/384b9dbf-bc23-49df-ac81-e2455fa70d1c/sist-en-60617-5-1997>

NORME
INTERNATIONALE
INTERNATIONAL
STANDARD

CEI
IEC

617-5

Deuxième édition
Second edition
1996-06

Symboles graphiques pour schémas –

**Partie 5:
Semiconducteurs et tubes électroniques**

Graphical symbols for diagrams –

**Part 5:
Semiconductors and electron tubes**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

© CEI 1996 Droits de reproduction réservés — Copyright - all rights reserved

Aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'éditeur. <https://standards.iteh.ai/catalog/standards/sist/617-5-1997>

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 the publisher.

Bureau central de la Commission Electrotechnique Internationale 3, rue de Varembe Genève, Suisse



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE

U

● Pour prix, voir catalogue en vigueur
For price, see current catalogue

CONTENTS

	Page
FOREWORD	5
INTRODUCTION	7
CHAPTER I: SEMICONDUCTOR DEVICES	
Section 1 Symbol elements	8
Section 2 Qualifying symbols particular to semiconductor devices	12
Section 3 Examples of semiconductor diodes	13
Section 4 Examples of thyristors	15
Section 5 Examples of transistors	18
Section 6 Examples of photo-sensitive and magnetic field sensitive devices	22
CHAPTER II: ELECTRON TUBES	
Section 7 Symbol elements, general	24
Section 8 Symbol elements mainly applicable to cathode-ray tubes and television camera tubes	26
Section 9 Symbol elements mainly applicable to microwave tubes	28
Section 10 Symbol elements applicable to miscellaneous tubes, including mercury arc rectifiers	31
Section 11 Examples of electronic tubes	32
Section 12 Examples of cathode-ray tubes	34
Section 13 Examples of microwave tubes	35
Section 14 Examples of miscellaneous tubes including mercury arc rectifiers	41
CHAPTER III: RADIATION DETECTORS AND ELECTROCHEMICAL DEVICES	
Section 15 Examples of ionizing radiation detectors	44
Section 16 Electrochemical devices	46
Annex A – Older symbols	47
Annex B – French alphabetic index	48
Annex C – English alphabetic index	54

iTeh STANDARD PREVIEW

(standards.iteh.ai)

SIST EN 60617-5:1997

<https://standards.iteh.ai/catalog/standards/sist/384b9dbf-bc23-49df-ac81-e2455fa70d1c/sist-en-60617-5-1997>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

GRAPHICAL SYMBOLS FOR DIAGRAMS –

Part 5: Semiconductors and electron tubes

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 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.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 617-5 has been prepared by subcommittee 3A: Graphical symbols for diagrams, of IEC technical committee 3: Documentation and graphical symbols.

This second edition cancels and replaces the first edition published in 1983 and constitutes a technical revision.

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

FDIS	Report on voting
3A/383/FDIS	3A/421/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.

<https://standards.itec.ai/catalog/standards/sist/384b9dbf-bc23-49df-ac81-e2455fa70d1c/sist-en-60617-5-1997>

Annexes A, B and C are for information only.

INTRODUCTION

This part of IEC 617 forms an element of a series which deals with graphical symbols for diagrams.

The series consists of the following parts:

- Part 1: General information, general index. Cross-reference tables
- Part 2: Symbol elements, qualifying symbols and other symbols having general application
- Part 3: Conductors and connecting devices
- Part 4: Basic passive components
- Part 5: Semiconductors and electron tubes
- Part 6: Production and conversion of electrical energy
- Part 7: Switchgear, controlgear and protective devices
- Part 8: Measuring instruments, lamps and signalling devices
- Part 9: Telecommunications: Switching and peripheral equipment
- Part 10: Telecommunications: Transmission
- Part 11: Architectural and topographical installation plans and diagrams
- Part 12: Binary logic elements
- Part 13: Analogue elements

The scope and the normative references for this series are given in IEC 617-1.

Symbols have been designed in accordance with requirements given in the future ISO 11714-1*. The module size $M = 2,5$ mm has been used. For better readability smaller symbols in this standard have been enlarged to double size and are marked "200 %" in the symbol column. To save space larger symbols have been reduced to half size and are marked "50 %" in the symbol column. In accordance with the future ISO 11714-1, clause 7, symbol dimensions (for instance height) may be modified in order to make space for a greater number of terminals or for other layout requirements. In all cases, whether the size is enlarged or reduced, or dimensions modified, the thickness of the original line should be maintained without scaling.

The symbols in this standard are laid out in such a way that the distance between connecting lines is a multiple of a certain module. The module $2M$ has been chosen to provide enough space for a required terminal designation. The symbols have been drawn to a size convenient for comprehension, using the same grid consistently in the representation of all symbols.

All symbols are designed within a grid in a computer-aided draughting system. The grid which was used has been reproduced in the background of the symbols.

The older symbols which were included in appendix A of the first edition of IEC 617-5 for a transitional period, are no longer part of this second edition, as they will definitely be withdrawn from use.

The indexes in Annex B and C include an alphabetic list of symbol names and their corresponding number. The symbol names are based on the description of the symbols of this part. A general index including an alphabetic list of symbols of all parts is given in IEC 617-1.







* At present, at the stage of Draft International Standard (document 3/563/DIS).

CHAPITRE I: DISPOSITIFS À SEMICONDUCTEURS

CHAPTER I: SEMICONDUCTOR DEVICES

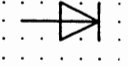







SECTION 1 – ÉLÉMENTS DE SYMBOLES

SECTION 1 – SYMBOL ELEMENTS

No.	Symbole Symbol	Légende	Description
05-01-01		Région de semiconducteur avec une connexion Le trait horizontal représente la région de semiconducteur et le trait perpendiculaire la connexion	Semiconductor region with one ohmic connection The horizontal line is the semiconductor region and the vertical line is the ohmic connection
05-01-02		Région de semiconducteur avec plusieurs connexions, figurée avec exemples à deux connexions	Semiconductor region with several ohmic connections, shown with examples with two ohmic connections
05-01-03			
05-01-04			
05-01-05		Canal conducteur pour dispositifs à déplétion	Conduction channel for depletion devices
05-01-06		Canal conducteur pour dispositifs à enrichissement	Conduction channel for enhancement devices

iTeh STANDARD PREVIEW
(standards.iteh.ai)

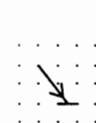



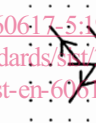
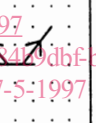
<https://standards.iteh.ai/catalog/standards/sist/384b9dbf-bc23-49df-ac81-e2455a70d1c/sist-en-60617-5-1997>
SIST EN 60617-5:1997

No.	Symbole	Symbol	Légende	Description
05-01-07		Jonction redresseuse	Rectifying Junction	
05-01-08	supprimé deleted	Transféré à Annexe A: 05-A-01	Transféré à Annexe A: 05-A-01	Transferred to Annex A: 05-A-01
05-01-09		Jonction influençant une région semiconductrice par un champ électrique, par exemple dans un transistor à effet de champ	Jonction influençant une région semiconductrice par un champ électrique, par exemple dans un transistor à effet de champ	Junction which influences a semiconductor layer by means of an electric field, for example in a junction field effect transistor
05-01-10		Région P influençant une région N	Région P influençant une région N	P-region which influences an N-layer
		Région N influençant une région P	Région N influençant une région P	N-region which influences a P-layer
05-01-11		Indication du type de la conductivité du canal pour transistors à effet de champ à grille isolée (IGFET)	Indication du type de la conductivité du canal pour transistors à effet de champ à grille isolée (IGFET)	Indication of the conductivity type of the channel for insulated gate field effect transistors (IGFET)
05-01-12		Canal de type N avec substrat de type P, figuré pour un dispositif à déplétion	Canal de type N avec substrat de type P, figuré pour un dispositif à déplétion	N-type channel on P-type substrate, shown for a depletion type IGFET
		Canal de type P avec substrat de type N, figuré pour un dispositif à enrichissement	Canal de type P avec substrat de type N, figuré pour un dispositif à enrichissement	P-type channel on an N-type substrate, shown for an enhancement type IGFET
05-01-13		Grille isolée	Grille isolée	Insulated gate
		Comme exemple avec plusieurs grilles, voir symbole 05-05-17.	Comme exemple avec plusieurs grilles, voir symbole 05-05-17.	For an example with multiple gates see symbol 05-05-17.

iTeh STANDARD PREVIEW
(standards.iteh.ai)






SIST EN 60617-5:1997

<https://standards.iteh.ai/catalog/standards/sist/384b9dbf-bc23-49df-ac81-e7455fa70d1c/sist-en:60617-5:1997>

No.	Symbole	Légende	Description
05-01-14		<p>Emetteur sur une région dont le type de conductibilité est différent</p> <p>Le trait oblique avec flèche représente l'émetteur.</p> <p>Emetteur P sur région N</p>	<p>Emitter on a region of dissimilar conductivity type</p> <p>The slanting line with arrow represents the emitter.</p> <p>P emitter on N region</p>
05-01-15		<p>Plusieurs émetteurs P sur région N</p>	<p>Several P emitters on N region</p>
05-01-16		<p>Emetteur N sur région P</p>	<p>N emitter on P region</p>
05-01-17		<p>Plusieurs émetteurs N sur région P</p>	<p>Several N emitters on P region</p>
05-01-18		<p>Collecteur sur une région dont le type de conductivité est différent</p> <p>Le trait oblique représente le collecteur.</p>	<p>Collector on a region of dissimilar conductivity type</p> <p>The slanting line represents the collector.</p>
05-01-19		<p>Plusieurs collecteurs sur une région dont le type de conductivité est différent</p>	<p>Several collectors on a region of dissimilar conductivity type</p>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60617-5:1997
<https://standards.iteh.ai/catalog/standards/sist/419dbf-bc23-49df-ac81-e2455fa70d11c/sist-en-60617-5:1997>

No.	Symbole	Symbol	Légende	Description
05-01-20			<p>Transition entre régions de types de conductivité différentes: de P à N, ou de N à P</p> <p>Le trait oblique court indique le point de passage de P à N ou de N à P le long de la ligne horizontale. Aucune connexion ne doit être faite au trait oblique court.</p>	<p>Transition between regions of dissimilar conductivity types, either P to N, or N to P</p> <p>The short slanting line indicates the point of change along the horizontal line from P to N, or from N to P. No ohmic connection shall be made to the short slanting line.</p>
05-01-21			<p>Région intrinsèque entre deux régions de type de conductivité différente formant une structure PIN ou NIP</p> <p>L'intervalle entre les traits obliques pontés représente la région intrinsèque. Toute connexion à la région I doit être faite entre les traits obliques courts et non sur ces traits</p>	<p>Intrinsic region separating regions of dissimilar conductivity type thus giving either a PIN or NIP structure</p> <p>The intrinsic region lies between the linked slanting lines. Any ohmic connection to the region I shall be made between the short slanting lines and not to them</p>
05-01-22			<p>Région intrinsèque entre deux régions du même type de conductivité formant une structure soit PIP soit NIN</p>	<p>Intrinsic region between regions of similar conductivity type giving either a PIP or NIN structure</p>
05-01-23			<p>Région intrinsèque entre un collecteur et une région de type de conductivité différente formant une structure PIN ou NIP</p>	<p>Intrinsic region between a collector and a region of dissimilar conductivity type giving either a PIN or NIP structure</p>
05-01-24			<p>La connexion au collecteur est faite sur le trait oblique long</p> <p>Région intrinsèque entre un collecteur et une région du même type de conductivité formant une structure soit PIP soit NIN</p> <p>La connexion au collecteur est faite sur le trait oblique long</p>	<p>The connection to the collector is made to the long slanting line</p> <p>Intrinsic region between a collector and a region of similar conductivity type giving either a PIP or NIN structure</p> <p>The connection to the collector is made to the long slanting line</p>

iTeh STANDARD PREVIEW
(standards.iteh.ai)






SIST EN 60617-5:1997

<https://standards.iteh.ai/catalog/standards/sist/384b9db176c23-49df-ac81-c2455fa70d1c/sist-en-60617-5-1997>

SECTION 2 – SYMBOLES DISTINCTIFS PARTICULIERS AUX DISPOSITIFS À SEMICONDUCTEURS

SECTION 2 – QUALIFYING SYMBOLS PARTICULAR TO SEMICONDUCTOR DEVICES

2.1 Si nécessaire, on peut représenter une fonction spéciale ou une propriété essentielle destinée au fonctionnement du circuit par un symbole distinctif placé à proximité ou formant partie du symbole du dispositif. 2.1 If necessary, a special function or property essential for circuit operation may be indicated by a qualifying symbol placed adjacent to, or forming part of the symbol of the device.

No.	Symbole	Symbol	Légende	Description
05-02-01		Effet Schottky		Schottky effect
05-02-02		Effet tunnel		Tunnel effect
05-02-03		Effet de claquage dans un seul sens Effet Zener		Unidirectional breakdown effect Zener effect
05-02-04		Effet de claquage symétrique		Bidirectional breakdown effect
05-02-05		Effet unitunnel		Backward effect (unitunnel effect)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/384b75d1-bc23-49df-ac81-e2455fa70d1c/sist-en-60617-5-1997>
SIST EN 60617-5:1997

SECTION 3 – EXEMPLES DE DIODES À SEMICONDUCTEUR

SECTION 3 – EXEMPLES OF SEMICONDUCTOR DIODES

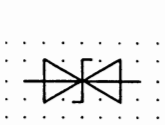
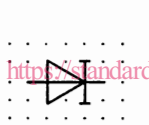

No.	Symbole	Symbol	Légende	Description
05-03-01		Diode à semiconducteur, symbole général	Semiconductor diode, general symbol	
05-03-02		Diode électroluminescente (LED), symbole général	Light emitting diode (LED), general symbol	
05-03-03		Diode à dépendance thermique	Temperature sensing diode	
05-03-04		Diode à capacité variable Varactor	Variable capacitance diode Varactor	
05-03-05		Diode tunnel Diode Esaki	Tunnel diode Esaki diode	
05-03-06		Diode à effet de claquage, unidirectionnelle Diode régulatrice de tension Diode Zener	Breakdown diode, unidirectional Voltage regulator diode Zener diode	

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60617-5:1997

<http://standards.iteh.org/catalog/standard/it/384b9dbfbc2349dfac81>

e2477470d1c/sist-en-60617-5-1997

No.	Symbole Symbol	Légende	Description
05-03-07		Diode à effet de claquage dans les deux sens	Breakdown diode, bidirectional
05-03-08		Diode unitunnel	Backward diode (unitunnel diode)
05-03-09		Diode bidirectionnelle	Bidirectional diode

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<http://standards.iteh.ai/catalog/standards/sist/384b9dbf-bc23-49df-ac81-e2455fa70d1c/sst-en-60617-5-1997>
SIST-EN 60617-5:1997