SLOVENSKI STANDARD
SIST EN IEC 60747-17:2021

01-januar-2021

Polprevodniški elementi - 17. del: Magnetni in kapacitivni spojnik za osnovno in ojačeno izolacijo (IEC 60747-17:2020)

Semiconductor devices - Part 17: Magnetic and capacitive coupler for basic and reinforced insulation (IEC 60747-17:2020)

Halbleiterbauelemente - Teil 17: Magnetische und kapazitive Koppler für Basisisolierung und verstärkte Isolierung (IEC 60747-17:2020)

Dispositifs à semiconducteurs - Partie 17: Coupleur magnétique et capacitif pour l'isolation principale et renforcée (IEC 60747-17:2020)

Ta slovenski standard je istoveten z: **EN IEC 60747-17:2020**

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SIST EN IEC 60747-17:2021 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60747-17

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English Version

Semiconductor devices - Part 17: Magnetic and capacitive coupler for basic and reinforced insulation (IEC 60747-17:2020)

Dispositifs à semiconducteurs - Partie 17: Coupleur magnétique et capacitif pour l'isolation principale et renforcée
(IEC 60747-17:2020)

Halbleiterbauelemente - Teil 17: Magnetische und kapazitive Koppler für Basisisolierung und verstärkte Isolierung
(IEC 60747-17:2020)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

The text of document 47E/711/FDIS, future edition 1 of IEC 60747-17, prepared by SC 47E "Discrete semiconductor devices" of IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60747-17:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-07-26
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-10-26

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The text of the International Standard IEC 60747-17:2020 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60060-1:2010	NOTE	Harmonized as EN 60060-1:2010 (not modified)
IEC 60068-1:2013	NOTE	Harmonized as EN 60068-1:2014 (not modified)
IEC 60068-2-6:2007	NOTE	Harmonized as EN 60068-2-6:2008 (not modified)
IEC 60068-2-17:1994	NOTE	Harmonized as EN 60068-2-17:1994 (not modified)
IEC 60068-2-27:2008	NOTE	Harmonized as EN 60068-2-27:2009 (not modified)
IEC 60270:2000	NOTE	Harmonized as EN 60270:2001 (not modified)
IEC 60664-4:2005	NOTE	Harmonized as EN 60664-4:2006 (not modified)
IEC 60747-5-5:2007	NOTE	Harmonized as EN 60747-5-5:2011 (not modified)
IEC 61000-4-5:2014	NOTE	Harmonized as EN 61000-4-5:2014 (not modified)
IEC 61000-4-8:2009	NOTE	Harmonized as EN 61000-4-8:2010 (not modified)
IEC 61000-4-9:2016	NOTE	Harmonized as EN 61000-4-9:2016 (not modified)
IEC 61649:2008	NOTE	Harmonized as EN 61649:2008 (not modified)
IEC 62368-1:2018	NOTE	Harmonized as EN IEC 62368-1:2020 (not modified)

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-1	2007	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	2007
IEC 60068-2-2	2007	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	2007
IEC 60068-2-14	2009	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	2009
IEC 60068-2-20	2008	Environmental testing - Part 2-20: Tests - Test T: Test methods for solderability and resistance to soldering heat of devices with leads	EN 60068-2-20	2008
IEC 60068-2-30	2005	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	2005
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)	EN 60068-2-58	2015
IEC 60068-2-67	1995	Environmental testing - Part 2-67: Tests - Test Cy: Damp heat, steady state, accelerated test primarily intended for components	EN 60068-2-67	1996
IEC 60112	2003	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112	2003
IEC 60216-1	2013	Electrical insulating materials - Thermal endurance properties - Part 1: Ageing procedures and evaluation of test results	EN 60216-1	2013

Publication	Year	Title	EN/HD	Year
IEC 60216-2	2005	Electrical insulating materials - Thermal endurance properties - Part 2: Determination of thermal endurance properties of electrical insulating materials - Choice of test criteria	EN 60216-2	2005
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC 60672-2	1999	Ceramic and glass insulating materials - Part 2: Methods of test	EN 60672-2	2000
IEC 60695-11-5	2016	Fire hazard testing - Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	2017
IEC 62539	2007	Guide for the statistical analysis of electrical insulation breakdown data	-	-

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Edition 1.0 2020-09

INTERNATIONAL STANDARD

Semiconductor devices –
Part 17: Magnetic and capacitive coupler for basic and reinforced insulation

INTERNATIONAL
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SEMICONDUCTOR DEVICES –

Part 17: Magnetic and capacitive coupler for basic and reinforced insulation

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.
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International Standard IEC 60747-17 has been prepared by subcommittee SC 47E: Discrete semiconductor devices, of IEC technical committee TC 47: Semiconductor devices.

This first edition cancels and replaces IEC PAS 60747-17:2011. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC PAS 60747-17:2011:

a) introduced lifetime safety factors for improved life time consideration, to comply with widely recognized aging mechanisms of silicone dioxide (TDDB) and thin film polymer isolation layers;
b) significantly improved "end of life testing" paragraph and statistical life time consideration by adding detailed description on process, safety factors, methods of generating data points and respective lifetime interpolations as well as being specific on minimum amount of samples required;

c) introduced concept of certification by similarity, including Annex A, giving guidance on qualification considerations and required certification process;

d) alternative pulse shape allowed for surge pulse testing, to avoid issues due to surge tester availability;

e) various improvements throughout the standard: definitions, for example type of coupler have been improved, introduction of surge impulse V_{IMP} rating, usage of glass transition temperature, pre-conditioning have been redefined for improved usability and better compatibility with today's design and functionality of couplers, available mold compounds, etc.

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

FDIS	Report on voting
47E/711/FDIS	47E/715/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 60747 series, published under the general title *Semiconductor devices*, 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.

SEMICONDUCTOR DEVICES –

Part 17: Magnetic and capacitive coupler for basic and reinforced insulation

1 Scope

This part of IEC 60747 specifies the terminology, essential ratings, characteristics, safety test and the measuring methods of magnetic coupler and capacitive coupler.

It specifies the principles and requirements of insulation and isolation characteristics for magnetic and capacitive couplers for basic insulation and reinforced insulation.

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 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-20:2008, *Environmental testing – Part 2-20: Tests – Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

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 60068-2-67:1995, *Environmental testing – Part 2: Tests – Test Cy: Damp heat, steady state, accelerated test primarily intended for components*

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60216-1:2013, *Electrical insulating materials – Thermal endurance properties – Part 1: Ageing procedures and evaluation of test results*

IEC 60216-2:2005, *Electrical insulating materials – Thermal endurance properties – Part 2: Determination of thermal endurance properties of electrical insulating materials – Choice of test criteria*

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

IEC 60672-2:1999, *Ceramic and glass insulating materials – Part 2: Methods of test*

IEC 60695-11-5:2016, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 62539:2007, *Guide for the statistical analysis of electrical insulation breakdown data*

3 Terms and definitions

3.1
details of outline and encapsulation
information related method of encapsulation and terminal connections within the coupler's isolation system

3.1.1
outline drawing
drawing or sketch restricted to line to describe the shape of objects or circuitry

3.1.2
method of encapsulation
encapsulating materials used forming part of the isolation system

3.1.3
terminal identification
terminal identification and indication of any connection between a terminal and the case

3.2
type of coupler
internal construction and insulation method of coupler to achieve basic or reinforced insulation

3.2.1
SiO_2 isolator
isolator with an internal insulation construction utilizing silicon dioxide based material

3.2.2
thin film polymer isolator
isolator with an internal insulation construction, utilising a thin film polymer insulation

3.3
isolation
ability to reject electrical and magnetic interference or noise

3.4
insulation
part of an electromechanical product which galvanically separates the conducting parts at different electrical potentials

3.4.1
reinforced insulation
insulation of hazardous-live-parts which provides a degree of protection against electric shock equivalent to double insulation

Note 1 to entry: Reinforced insulation may comprise several layers which cannot be tested singly as basic insulation or supplementary insulation.

[SOURCE: IEC 60664-1:2007, 3.17.5]

3.4.2
basic insulation
insulation providing a basic safeguard against electric shock

3.5
isolation side
all terminals of side 1 which are isolated from all terminals of side 2 by an isolation barrier, forming a two-terminal device

3.6
isolation capacitance
C_{IO}
total capacitance between the terminals on side 1 of the isolation barrier connected together and the terminals on side 2 of the isolation barrier connected together forming a two-terminal device

Note 1 to entry: See IEC 60747-5-5:2007, 4.3.

3.7
isolation resistance
R_{IO}
resistance between the terminals on side 1 of the isolation barrier connected together and all the terminals on side 2 of the isolation barrier connected together forming a two-terminal device

3.8
isolation resistance at safety limiting temperature
R_{IO_S}
resistance at safety limiting temperature T_S between the terminals on side 1 of the isolation barrier connected together and all the terminals on side 2 of the isolation barrier connected together forming a two-terminal device which should be larger or equal to 1E9 Ω

3.9
isolation voltage
voltage between any specified terminals connected together on side 1 of the isolation barrier and any terminals connected together on side 2 of the isolation barrier

3.10
logic state match
condition in which an output logic state matches the associated input logic state

3.11
logic state transition match
condition in which an output logic state change follows the associated input logic state change

3.12
common mode transient immunity
CMTI
maximum tolerable rate-of-rise (or fall) of a common-mode voltage

Note 1 to entry: The common mode transient immunity is given in volts per second. CMTI should include the amplitude of the common-mode voltage that can be tolerated.

3.12.1
common mode transient immunity at logic high output
$|CM_H|$
common mode transient immunity of the coupler with logic at high output