



NSAI
Standards

Irish Standard
I.S. EN 60747-16-3:2002&A1:2009&A2:2017

Semiconductor devices - Part 16-3: Microwave integrated circuits - Frequency converters

I.S. EN 60747-16-3:2002&A1:2009&A2:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

EN 60747-16-3:2002/A1:2009
EN 60747-16-3:2002/A2:2017

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National Foreword

I.S. EN 60747-16-3:2002&A1:2009&A2:2017 is the adopted Irish version of the European Document EN 60747-16-3:2002, Semiconductor devices - Part 16-3: Microwave integrated circuits - Frequency converters

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EUROPEAN STANDARD

EN 60747-16-3:2002/A2

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2017

ICS 31.080.99

English Version

**Semiconductor devices - Part 16-3: Microwave integrated
circuits - Frequency converters
(IEC 60747-16-3:2002/A2:2017)**

Dispositifs à semiconducteurs - Partie 16-3: Circuits
intégrés hyperfréquences - Convertisseurs de fréquence
(IEC 60747-16-3:2002/A2:2017)

Halbleiterbauelemente - Teil 16-3: Integrierte Schaltungen
zur Frequenzumsetzung von Mikrowellen
(IEC 60747-16-3:2002/A2:2017)

This amendment A2 modifies the European Standard EN 60747-16-3:2002; it was approved by CENELEC on 2017-09-20. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

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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

EN 60747-16-3:2002/A2:2017 (E)

European foreword

The text of document 47E/545/CDV, future IEC 60747-16-3:2002/A2, 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 60747-16-3:2002/A2:2017.

The following dates are fixed:

- latest date by which the document has to be (dop) 2018-06-20
implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2020-09-20
standards conflicting with the
document have to be withdrawn

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The text of the International Standard IEC 60747-16-3:2002/A2:2017 was approved by CENELEC as a European Standard without any modification.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60747-16-3/A1

April 2009

ICS 31.080.99

English version

**Semiconductor devices -
Part 16-3: Microwave integrated circuits -
Frequency converters
(IEC 60747-16-3:2002/A1:2009)**

Dispositifs à semiconducteurs -
Partie 16-3: Circuits intégrés
hyperfréquences -
Convertisseurs de fréquence
(CEI 60747-16-3:2002/A1:2009)

Halbleiterbauelemente -
Teil 16-3: Integrierte Schaltungen zur
Frequenzumsetzung von Mikrowellen
(IEC 60747-16-3:2002/A1:2009)

This amendment A1 modifies the European Standard EN 60747-16-3:2002; it was approved by CENELEC on 2009-04-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

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CENELEC

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

Central Secretariat: avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 47E/357/CDV, future amendment 1 to IEC 60747-16-3:2002, prepared by SC 47E, Discrete semiconductor devices, of IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60747-16-3:2002 on 2009-04-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2010-01-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2012-04-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of amendment 1:2009 to the International Standard IEC 60747-16-3:2002 was approved by CENELEC as an amendment to the European Standard without any modification.

EUROPEAN STANDARD

EN 60747-16-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2002

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English version

Semiconductor devices
Part 16-3: Microwave integrated circuits -
Frequency converters
(IEC 60747-16-3:2002)

Dispositifs à semiconducteurs
Partie 16-3: Circuits intégrés
hyperfréquences -
Convertisseurs de fréquence
(CEI 60747-16-3:2002)

Halbleiterbauelemente
Teil 16-3: Integrierte Schaltungen zur
Frequenzumsetzung von Mikrowellen
(IEC 60747-16-3:2002)

This European Standard was approved by CENELEC on 2002-07-01. 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.

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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 47E/212/FDIS, future edition 1 of IEC 60747-16-3, prepared by SC 47E, Discrete semiconductor devices, of IEC TC 47, Semiconductor device, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60747-16-3 on 2002-07-01.

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) 2003-04-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-07-01

Les annexes appelées "normatives" font partie du corps de la norme.
Dans la présente norme, l'annexe ZA est normative.
L'annexe ZA a été ajoutée par le CENELEC.

Endorsement notice

The text of the International Standard IEC 60747-16-3:2002 was approved by CENELEC as a European Standard without any modification.

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 60617-12	- ¹⁾	Graphical symbols for diagrams Part 12: Binary logic elements	EN 60617-12	1998 ²⁾
IEC 60617-13	- ¹⁾	Part 13: Analogue elements	EN 60617-13	1993 ²⁾
IEC 60747-1	1983	Semiconductor devices - Discrete devices and integrated circuits Part 1: General	-	-
IEC 60748-2	1997	Semiconductor devices - Integrated circuits Part 2: Digital integrated circuits	-	-
IEC 60748-3	- ¹⁾	Part 3: Analogue integrated circuits	-	-
IEC 60748-4	- ¹⁾	Part 4: Interface integrated circuits	-	-

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

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INTERNATIONAL STANDARD

IEC
60747-16-3

First edition
2002-05

Semiconductor devices –

**Part 16-3:
Microwave integrated circuits –
Frequency converters**

Dispositifs à semiconducteurs –

*Partie 16-3:
Circuits intégrés hyperfréquences –
Convertisseurs de fréquence*



Reference number
IEC 60747-16-3:2002(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

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The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

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INTERNATIONAL STANDARD

IEC 60747-16-3

First edition
2002-05

Semiconductor devices –

Part 16-3: Microwave integrated circuits – Frequency converters

Dispositifs à semiconducteurs –

*Partie 16-3:
Circuits intégrés hyperfréquences –
Convertisseurs de fréquence*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES –

**Part 16-3: Microwave integrated circuits –
Frequency converters**

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.
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International Standard IEC 60747-16-3 has been prepared by subcommittee 47E: Discrete semiconductor devices, of IEC technical committee 47: Semiconductor devices.

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

FDIS	Report on voting
47E/212/FDIS	47E/219/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 2008. At this date, the publication will be

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

SEMICONDUCTOR DEVICES –

Part 16-3: Microwave integrated circuits – Frequency converters

1 Scope

This part of IEC 60747 provides new measuring methods, terminology and letter symbols, as well as essential ratings and characteristics for integrated circuit microwave frequency converters.

2 Normative references

The following referenced documents are indispensable for the application 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 60617-12, *Graphical symbols for diagrams – Part 12: Binary logic elements*

IEC 60617-13, *Graphical symbols for diagrams – Part 13: Analogue elements*

IEC 60747-1:1983, *Semiconductor devices – Discrete devices and integrated circuits – Part 1: General*

IEC 60748-2:1997, *Semiconductor devices – Integrated circuits – Part 2: Digital integrated circuits*

IEC 60748-3, *Semiconductor devices – Integrated circuits – Part 3: Analogue integrated circuits*

IEC 60748-4, *Semiconductor devices – Integrated circuits – Part 4: Interface integrated circuits*

3 Terms and definitions

For the purpose of this part of IEC 60747, the following terms and definitions apply:

3.1

conversion gain, G_c

ratio of the desired converted output power to the input power

NOTE Usually, the conversion gain is expressed in decibels.

3.2

conversion gain flatness, ΔG_c

difference between the maximum and the minimum conversion gain for a specified input power in a specified frequency range

3.3

LO/RF isolation, $P_{LO}/P_{LO(RF)}$

ratio of the incident local power to the local leakage power at the RF port with the IF port terminated in a specified impedance

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