



**NSAI**  
Standards

Irish Standard

I.S. EN 60747-16-1:2002&A1:2007&A2:2017

# Semiconductor devices - Part 16-1: Microwave integrated circuits - Amplifiers

**I.S. EN 60747-16-1:2002&A1:2007&A2:2017**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

EN 60747-16-1:2002/A1:2007

EN 60747-16-1:2002/A2:2017

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NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

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## National Foreword

I.S. EN 60747-16-1:2002&A1:2007&A2:2017 is the adopted Irish version of the European Document EN 60747-16-1:2002, Semiconductor devices - Part 16-1: Microwave integrated circuits - Amplifiers

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**EUROPEAN STANDARD**  
**NORME EUROPÉENNE**  
**EUROPÄISCHE NORM**

**EN 60747-16-1:2002/A2**

May 2017

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English Version

**Semiconductor devices -**  
**Part 16-1: Microwave integrated circuits - Amplifiers**  
**(IEC 60747-16-1:2001/A2:2017)**

Dispositifs à semiconducteurs -  
Partie 16-1: Circuits intégrés hyperfréquences -  
Amplificateurs  
(IEC 60747-16-1:2001/A2:2017)

Halbleiterbauelemente -  
Teil 16-1: Integrierte Mikrowellen-Verstärker  
(IEC 60747-16-1:2001/A2:2017)

This amendment A2 modifies the European Standard EN 60747-16-1:2002; it was approved by CENELEC on 2017-03-22. 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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Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## **EN 60747-16-1:2002/A2:2017**

### **European foreword**

The text of document 47E/500/CDV, future IEC 60747-16-1:2001/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 60747-16-1:2002/A2:2017.

The following dates are fixed:

- latest date by which the document has to be (dop) 2017-12-22  
implemented at national level by  
publication of an identical national  
standard or by endorsement
- latest date by which the national (dow) 2020-03-22  
standards conflicting with the  
document have to be withdrawn

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**EUROPEAN STANDARD**  
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**EUROPÄISCHE NORM**

**EN 60747-16-1/A1**

February 2007

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**Semiconductor devices -**  
**Part 16-1: Microwave integrated circuits -**  
**Amplifiers**  
(IEC 60747-16-1:2001/A1:2007)

Dispositifs à semiconducteurs -  
Partie 16-1: Circuits intégrés  
hyperfréquences -  
Amplificateurs  
(CEI 60747-16-1:2001/A1:2007)

Halbleiterbauelemente -  
Teil 16-1: Integrierte  
Mikrowellen-Verstärker  
(IEC 60747-16-1:2001/A1:2007)

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

## Foreword

The text of document 47E/305/FDIS, future amendment 1 to IEC 60747-16-1:2001, 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 60747-16-1:2002 on 2007-02-01.

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- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2007-11-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2010-02-01

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of amendment 1:2006 to the International Standard IEC 60747-16-1:2001 was approved by CENELEC as an amendment to the European Standard without any modification.

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EUROPEAN STANDARD

**EN 60747-16-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2002

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English version

**Semiconductor devices**  
**Part 16-1: Microwave integrated circuits -**  
**Amplifiers**  
(IEC 60747-16-1:2001)

Dispositifs à semiconducteurs  
Partie 16-1: Circuits intégrés  
hyperfréquences -  
Amplificateurs  
(CEI 60747-16-1:2001)

Halbleiterbauelemente  
Teil 16-1: Integrierte Mikrowellen-  
Verstärker  
(IEC 60747-16-1:2001)

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EN 60747-16-1:2002

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## Foreword

The text of document 47E/200/FDIS, future edition 1 of IEC 60747-16-1, 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 EN 60747-16-1 on 2002-02-01.

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- 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.

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## Endorsement notice

The text of the International Standard IEC 60747-16-1:2001 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 60617-12	1997	Graphical symbols for diagrams Part 12: Binary logic elements	EN 60617-12	1998
IEC 60617-13	1993	Part 13: Analogue elements	EN 60617-13	1993
IEC 60747-1	1983	Semiconductor devices - Discrete devices Part 1: General	-	-
IEC 60747-7	2000	Part 7: Bipolar transistors	-	-
IEC 60748-2	1997	Semiconductor devices - Integrated circuits Part 2: Digital integrated circuits	-	-
IEC 60748-3	1986	Part 3: Analogue integrated circuits	-	-
IEC 60748-4	1997	Part 4: Interface integrated circuits	-	-

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# INTERNATIONAL STANDARD

**IEC**  
**60747-16-1**

First edition  
2001-11

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## **Semiconductor devices –**

### **Part 16-1: Microwave integrated circuits – Amplifiers**

*Dispositifs à semiconducteurs –*

*Partie 16-1:  
Circuits intégrés hyperfréquences –  
Amplificateurs*



Reference number  
IEC 60747-16-1:2001(E)

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# INTERNATIONAL STANDARD

**IEC**  
**60747-16-1**

First edition  
2001-11

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## **Semiconductor devices –**

### **Part 16-1: Microwave integrated circuits – Amplifiers**

*Dispositifs à semiconducteurs –*

*Partie 16-1:  
Circuits intégrés hyperfréquences –  
Amplificateurs*

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International Electrotechnical Commission 3, rue de Varembé Geneva, Switzerland  
Telefax: +41 22 919 0300 e-mail: [inmail@iec.ch](mailto:inmail@iec.ch) IEC web site <http://www.iec.ch>



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### SEMICONDUCTOR DEVICES –

#### Part 16-1: Microwave integrated circuits – Amplifiers

### 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 60747-16-1 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/200/FDIS	47E/204/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 2004. At this date, the publication will be

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

A bilingual version of this standard may be issued at a later date.

## SEMICONDUCTOR DEVICES –

### Part 16-1: Microwave integrated circuits – Amplifiers

#### 1 Scope

This part of IEC 60747 provides the terminology, the essential ratings and characteristics, as well as the measuring methods for integrated circuit microwave power amplifiers.

#### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60747. 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 60747 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 60617-12:1997, *Graphical symbols for diagrams – Part 12: Binary logic elements*

IEC 60617-13:1993, *Graphical symbols for diagrams – Part 13: Analogue elements*

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

IEC 60747-7:2000, *Semiconductor devices – Part 7: Bipolar transistors*

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

IEC 60748-3:1986, *Semiconductor devices – Integrated circuits – Part 3: Analogue integrated circuits*

IEC 60748-4:1997, *Semiconductor devices – Integrated circuits – Part 4: Interface integrated circuits*

#### 3 Terminology

##### 3.1

##### **linear (power) gain $G_{lin}$**

power gain in the linear region of the power transfer curve  $P_o$  (dBm) =  $f(P_i)$

NOTE In this region,  $\Delta P_o$  (dBm) =  $\Delta P_i$  (dBm).

##### 3.2

##### **linear (power) gain flatness $\Delta G_{lin}$**

power gain flatness when the operating point lies in the linear region of the power transfer curve

##### 3.3

##### **power gain $G_p$ , $G$**

ratio of the output power to the input power

NOTE Usually the power gain is expressed in decibels.

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