SLOVENSKI STANDARD
SIST EN 60747-16-1:2004/A1:2007

01-december-2007

Polprevodniġke naprave - 16-1. del: Mikrovalovna integrirana vezja - Ojaļ evalniki (IEC 60747-16-1:2001/A1:2007)

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

Halbleiterbauelemente -- Teil 16-1: Integrierte Mikrowellen-Verstärker

Dispositifs à semiconducteurs -- Partie 16-1: Circuits intégrés hyperfréquences - Amplificateurs

Ta slovenski standard je istoveten z: **EN 60747-16-1:2002/A1:2007**

ICS:

31.080.01	Polprevodniški elementi (naprave) na splošno	Semiconductor devices in general
31.200	Integrirana vezja, mikroelektronika	Integrated circuits. Microelectronics

SIST EN 60747-16-1:2004/A1:2007 **en,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60747-16-1/A1

February 2007

ICS 31.080.99

English version

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)

This amendment A1 modifies the European Standard EN 60747-16-1:2002; it was approved by CENELEC on 2007-02-01. 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.

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 amendment 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, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the 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

Ref. No. EN 60747-16-1:2002/A1:2007 E

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.

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)	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.

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.

Replace Annex ZA of EN 60747-16-1:2002 by:

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

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

Publication	Year	Title	EN/HD	Year
IEC 60617	data-base	Graphical symbols for diagrams	-	-
IEC 60747-1	2006	Semiconductor devices - Part 1: General	-	-
IEC 60747-4	-[1)]	Semiconductor devices - Discrete devices - Part 4: Microwave diodes and transistors	-	-
IEC 60747-7	2000	Semiconductor devices - Part 7: Bipolar transistors	-	-
IEC 60747-16-2	2001	Semiconductor devices - Part 16-2: Microwave integrated circuits - Frequency prescalers	-	-
IEC 60747-16-4	2004	Semiconductor devices - Part 16-4: Microwave integrated circuits - Switches	EN 60747-16-4	2004
IEC 60748-2	1997	Semiconductor devices - Integrated circuits - Part 2: Digital integrated circuits	-	-
IEC 60748-3	1986	Semiconductors devices - Integrated circuits - Part 3: Analogue integrated circuits	-	-
IEC 60748-4	1997	Semiconductor devices - Integrated circuits - Part 4: Interface integrated circuits	-	-
IEC/TS 61340-5-1 + corr. February	1998 1999	Electrostatics - Part 5-1: Protection of electronic devices from electrostatic phenomena - General requirements	EN 61340-5-1 + corr. April	2001 2001
IEC/TS 61340-5-2	1999	Electrostatics - Part 5-2: Protection of electronic devices from electrostatic phenomena - User guide	EN 61340-5-2 + corr. August	2001 2001

[1)] At draft stage.

INTERNATIONAL STANDARD

IEC 60747-16-1

2001

AMENDMENT 1
2007-01

Amendment 1

Semiconductor devices –

Part 16-1: Microwave integrated circuits – Amplifiers

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE Q

For price, see current catalogue

FOREWORD

This amendment has been prepared by subcommittee 47E: Discrete semiconductor devices, of IEC technical committee 47: Semiconductor devices.

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

FDIS	Report on voting
47E/305/FDIS	47E/317/RVD

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

Page 2

CONTENTS

Replace the titles of Subclauses 5.11, 5.13, 5.14, 5.15, 5.19, and 5.21 by the following new titles:

5.11 Intermodulation distortion (two-tone) (P_1/P_n)
5.13 Magnitude of the input reflection coefficient (input return loss) ($|S_{11}|$)
5.14 Magnitude of the output reflection coefficient (output return loss) ($|S_{22}|$)
5.15 Magnitude of the reverse transmission coefficient (isolation) ($|S_{12}|$)
5.19 *n*th order harmonic distortion ratio (P_1/P_{nth})
5.21 Spurious intensity under specified load VSWR (P_o/P_{sp})

Add the titles of following new clause and subclauses:

5.22 Adjacent channel power ratio ($P_{o(mod)}/P_{adj}$)
6 Verifying methods
6.1 Load mismatch tolerance (Ψ_L)
6.2 Source mismatch tolerance (Ψ_S)
6.3 Load mismatch ruggedness (Ψ_R)

Add the titles of following new figures:

Figure 12 – Circuit for the measurement of the adjacent channel power ratio
Figure 13 – Circuit for the verification of load mismatch tolerance in method 1
Figure 14 – Circuit for the verification of load mismatch tolerance in method 2
Figure 15 – Circuit for the verification of source mismatch tolerance in method 1
Figure 16 – Circuit for the verification of source mismatch tolerance in the method 2
Figure 17 – Circuit for the verification of load mismatch ruggedness

Page 5

2 Normative references

Replace existing references IEC 60617-12, IEC 60617-13 and IEC 60747-1 as follows:

IEC 60617:2001, *Graphical symbols for diagrams*

IEC 60747-1:2006, *Semiconductor devices – Part 1: General*

IEC 60747-4:-, *Semiconductor devices – Discrete devices – Part 4: Microwave diodes and transistors*[1]

IEC 60747-16-2:2001, *Semiconductor devices – Part 16-2: Microwave integrated circuits – Frequency prescalers*

IEC 60747-16-4:2004, *Semiconductor devices – Part 16-4: Microwave integrated circuits – Switches*

IEC/TS 61340-5-1:1998, *Electrostatics - Part 5-1: Protection of electronic devices from electrostatic phenomena - General requirements*

IEC/TS 61340-5-2:1999, *Electrostatics - Part 5-2: Protection of electronic devices from electrostatic phenomena - User guide*

3 Terminology

Replace, on pages 6 and 7, the terms 3.7, 3.9, 3.10, 3.11, 3.14, and 3.16 by the following new terms:

3.7
intermodulation distortion P_1/P_n
ratio of the fundamental component of the output power to the *n*th order component of the output power, at a specified input power

3.9
magnitude of the input reflection coefficient
(input return loss)
$|S_{11}|$
see 3.5.2.1 of IEC 60747-7

3.10
magnitude of the output reflection coefficient
(output return loss)
$|S_{22}|$
see 3.5.2.2 of IEC 60747-7

3.11
magnitude of the reverse transmission coefficient
(isolation)
$|S_{12}|$
see 3.5.2.4 of IEC 60747-7

3.14
***n*th order harmonic distortion ratio P_1/P_{nth}**
ratio of the power of the fundamental frequency measured at the output port of the device to the power of the *n*th order harmonic component measured at the output port for a specified output power

---

1 The second edition of IEC 60747-4, which is cited in this standard, and to which terms introduced in this amendment refer, is currently in preparation (ADIS).

3.16
spurious intensity under specified load VSWR P_o/P_{sp}
ratio of the power of the fundamental frequency measured at the output port of the device to the maximum spurious power measured at the output port under specified load VSWR

Add the following new terms:

3.17
output power
P_o
see 3.3 of IEC 60747-16-2

3.18
output power at 1 dB gain compression
$P_{o(1dB)}$
see 8.2.13 of IEC 60747-4

3.19
noise figure
F
see 702-08-57 of IEC 60050-702

3.20
power added efficiency
η_{add}
see 8.2.15 of IEC 60747-4

3.21
adjacent channel power ratio
$P_{o(mod)}/P_{adj}$
see 3.10 of IEC 60747-16-4

3.22
load mismatch tolerance
Ψ_L
see 7.2.20 of IEC 60747-4

3.23
source mismatch tolerance
Ψ_S
see 7.2.21 of IEC 60747-4

3.24
load mismatch ruggedness
Ψ_R
see 7.2.22 of IEC 60747-4

Page 9

4.3.1 Detailed block diagram – Functional blocks

Replace, in the last paragraph, "IEC 60617-12 or IEC 60617-13" by "IEC 60617" .

Page 12

4.6.2 Dynamic or a.c. characteristics

Replace the title and parameters 4.6.2.10, 4.6.2.20 and 4.6.22 by the following new title and new parameters:

4.6.2 Dynamic or r.f. characteristics

Parameters		Min.	Max.	Types			
				A	B	C	D
4.6.2.10	Intermodulation distortion	+				+	+
4.6.2.20	*n*th order harmonic distortion ratio (where appropriate) (note 2)	+					+
4.6.2.22	Spurious intensity under specified load VSWR (where appropriate) (note 2)	+					+

Add the following new parameters:

Parameters		Min.	Max.	Types			
				A	B	C	D
4.6.2.23	Adjacent channel power ratio (where appropriate)	+					+
4.6.2.24	Load mismatch tolerance (where appropriate)		+				+
4.6.2.25	Source mismatch tolerance (where appropriate)		+				+
4.6.2.26	Load mismatch ruggedness (where appropriate)		+				+

Page 14

4.7 Mechanical and environmental ratings, characteristics and data

Replace "IEC 60747-1, Chapter VI, clause 7" by "Subclause 5.10 and 5.11 of IEC 60747-1:2006".

4.8.8 Handling precautions

Replace "IEC 60747-1, Chapter IX" by "IEC 61340-5-1 and IEC 61340-5-2".

Page 15

5.1.2 General precautions

Replace "clause 2 of IEC 60747-1, Chapter VII, Section One" by "clause 6.3, 6.4 and 6.6 of IEC 60747-1:2006".

5.1.3 Handling precautions

Replace "clause 1 of IEC 60747-1, Chapter IX" by "IEC 61340-5-1 and IEC 61340-5-2".