IEC 60747-16-1

Edition 1.0 2017-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 2
AMENDEMENT 2

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

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

IEC 60747-16-1:2001-11/AMD2:2017-02(en-fr)

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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:

CDV	Report on voting
47E/500/CDV	47E/518/RVC

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

CONTENTS

Replace the titles of Clause 3, Subclauses 5.7 and 5.18 with the following new titles:

3 Terms and definitions

5.7 Limiting output power ($P_{o(ltg)}$) and limiting output power flatness ($\Delta P_{o(ltg)}$)

5.18 Power added efficiency (η_{add})

Replace the titles of Subclauses 5.11, 5.19, 5.21, including the amendments brought to them by Amendment 1, with the following new titles:

5.11 Intermodulation distortion (two-tone) (P_n/P_1)

5.19 nth order harmonic distortion ratio (P_{nth}/P_1)

5.21 Spurious intensity under specified load VSWR (P_{sp}/P_o)

Replace the title of Subclause 5.22 added by Amendment 1 with the following new title:

5.22 Adjacent channel power ratio ($P_{adj}/P_{o(mod)}$)

2 Normative references

Replace the existing references IEC 60617, IEC 60747-1, IEC 60747-4, IEC 61340-5-1 and IEC 61340-5-2 including the amendments brought to them by Amendment 1 as follows:

IEC 60617, *Graphical symbols for diagrams* (available at: <http://std.iec.ch/iec60617>)

IEC 60747-1:2006, *Semiconductor devices – Part 1: General*
IEC 60747-1:2006/AMD1:2010

IEC 60747-4:2007, *Semiconductor devices – Discrete devices – Part 4: Microwave diodes and transistors*
IEC 60747-4:2007/AMD1:2017

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

IEC TR 61340-5-2, *Electrostatics – Part 5-2: Protection of electronic devices from electrostatic phenomena – User guide*

Replace the existing reference IEC 60748-3 as follows:

IEC 60748-3:1986, *Semiconductor devices – Integrated circuits – Part 3: Analogue integrated circuits*
IEC 60748-3:1986/AMD1:1991
IEC 60748-3:1986/AMD2:1994

Delete the existing reference to IEC 60747-7:2000:

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

Delete the references IEC 60747-16-2 and IEC 60747-16-4 added by Amendment 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*

Add the new reference IEC 60050-702:

IEC 60050-702, *International Electrotechnical Vocabulary – Chapter 702: Oscillations, signals and related devices* (available at: http://www.electropedia.org)

3 Terminology

Replace the clause title with the following new title and introductory paragraph:

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

Replace entries 3.7, 3.14, and 3.16, including the amendments brought to them by Amendment 1, with the following new entries:

3.7
intermodulation distortion
P_n/P_1
ratio of the nth order component of the output power to the fundamental component of the output power

Note 1 to entry: The abbreviation "IMD_n" is in common use for the nth order intermodulation distortion.

SOURCE: IEC 60747-4:2007/AMD1:2017, 7.2.19.

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

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

Replace entries 3.17 and 3.21 added by Amendment 1 with the following new entries:

3.17
output power
P_o
RF power measured at the output port

SOURCE: IEC 60747-4:2007/AMD1:2017, 7.2.2.

3.21
adjacent channel power ratio
$P_{adj}/P_{o(mod)}$
ratio of the total output power in a specified frequency band away from a specified carrier signal frequency to the total power in a specified carrier signal frequency band, when a modulation signal is supplied

Replace, in entry 3.9 as modified by Amendment 1, the words "see 3.5.2.1 of IEC 60747-7" *by* "see 7.4.3.10.2.2 of IEC 60747-4:2007".

Replace, in entry 3.10, the words "see 3.5.2.2 of IEC 60747-7" *by* "see 7.4.3.10.2.2 of IEC 60747-4:2007".

Replace, in entry 3.11, the words "see 3.5.2.4 of IEC 60747-7" *by* "see 7.4.3.10.2.2 of IEC 60747-4:2007".

4.4.2 Temperatures

Replace the existing item 1), with the following new item:

1) Operating temperature (ambient or reference-point temperature)

4.6.2 Dynamic or r.f. characteristics

Replace parameters 4.6.2.10, 4.6.2.20, 4.6.2.22 and 4.6.2.23 including the amendments brought to them by Amendment 1 with the following new parameters:

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)		+				+
4.6.2.23	Adjacent channel power ratio (where appropriate)		+				+

5.7 Limiting output power ($P_{o(ltg)}$)

Replace the existing title and first line with the following new title:

5.7 Limiting output power ($P_{o(ltg)}$) and limiting output power flatness ($\Delta P_{o(ltg)}$)

5.11 Intermodulation distortion (two-tone) (P_1/P_n)

Replace the existing title including the amendments brought to it by Amendment 1 with the following new title:

5.11 Intermodulation distortion (two-tone) (P_n/P_1)

5.11.3 Principle of measurement

Replace, in the last paragraph of this subclause as modified by Amendment 1 "P_1/P_n" with "P_n/P_1".

Replace Equation (16) as modified by Amendment 1 as follows:

$$P_n/P_1 = P_n - P_1 = P_c - P_b \quad (16)$$

5.18 Power added efficiency

Replace the existing title with the following new title:

5.18 Power added efficiency (η_{add})

5.19 *n*th order harmonic distortion ratio (P_1/P_{nth})

Replace the existing title including the amendments brought to it by Amendment 1 with the following new title:

5.19 *n*th order harmonic distortion ratio (P_{nth}/P_1)

5.19.3 Principle of measurement

Replace the existing first sentence and Equation (29) including the amendments brought to them by Amendment 1 as follows:

In the circuit diagram shown in Figure 9, *n*th order harmonic distortion ratio P_{nth}/P_1 in dBc is derived from Equation (29):

$$P_{nth}/P_1 = P_{nth} - P_1 \quad (29)$$

5.21 Spurious intensity under specified load VSWR (P_o/P_{sp})

Replace the existing title including the amendments brought to it by Amendment 1 with the following new title:

5.21 Spurious intensity under specified load VSWR (P_{sp}/P_o)

5.21.3 Principle of measurement

Replace the existing last sentence and Equation (35) including the amendments brought to them by Amendment 1 as follows:

The spurious intensity P_{sp}/P_o in dBc is defined as follows:

$$P_{sp}/P_o = P_{sp} - P_o \quad (35)$$

5.22 Adjacent channel power ratio ($P_{o(mod)}/P_{adj}$)

Replace the title of this subclause added by Amendment 1 with the following new title:

5.22 Adjacent channel power ratio ($P_{adj}/P_{o(mod)}$)

5.22.3 Principle of measurement

Replace the existing second sentence in the first paragraph as follows:

Adjacent channel power ratio $P_{adj}/P_{o(mod)}$ is the ratio of P_{adj} to $P_{o(mod)}$.

Replace the existing second paragraph and Equation (39) as follows:

$P_{adj}/P_{o(mod)}$ in dBc is given as the following equations in the circuit of Figure 12.

$$P_{adj}/P_{o(mod)} = P_{adj} - P_{o(mod)} = P_3 - P_2 \quad (39)$$

Replace the existing last line as follows:

$P_{adj}/P_{o(mod)}$ is expressed in dBc.

5.22.6 Measurement procedure

Replace the existing twelfth paragraph as follows:

Adjacent channel power ratio $P_{adj}/P_{o(mod)}$ is calculated from Equation (39).

6.1.2.4 Test procedure

Replace the sixth sentence of this subclause added by Amendment 1 as follows:

The phase angle is swept continuously by varying the length of the line stretcher.

6.1.3.4 Test procedure

Replace the fifth sentence as follows:

The phase angle is swept continuously by varying the length of the line stretcher.

6.2.2.4 Test procedure

Replace the sixth sentence as follows:

The phase angle is swept continuously by varying the length of the line stretcher.

6.2.3.4 Test procedure

Replace the fifth sentence as follows:

The phase angle is swept continuously by varying the length of the line stretcher.

6.3.5 Test procedure

Replace the sixth sentence as follows:

The phase angle is swept continuously by varying the length of the line stretcher.

_____