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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Semiconductor devices –
Part 16-8: Microwave integrated circuits – Limiters

Dispositifs à semiconducteurs –
Partie 16-8: Circuits intégrés hyperfréquences – Limiteurs



IEC 60747-16-8:2022-11 (en-fr)



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SEMICONDUCTOR DEVICES –

Part 16-8: Microwave integrated circuits – Limiters

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

Draft	Report on voting
47E/793/FDIS	47E/799/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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- replaced by a revised edition, or
- amended.

SEMICONDUCTOR DEVICES –

Part 16-8: Microwave integrated circuits – Limiters

1 Scope

This part of IEC 60747 specifies the terminology, essential ratings and characteristics, and measuring methods of microwave integrated circuit limiters.

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

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

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*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
insertion loss
L_{ins}
ratio of the input power to the output power, in the linear region of the power transfer curve P_o(dBm) = $f(P_i)$

Note 1 to entry: In this region, ΔP_o(dBm) = ΔP_i(dBm).

Note 2 to entry: Usually the insertion loss is expressed in decibels.

[SOURCE: IEC 60747-16-4:2004/AMD 1:2009, 3.1, modified – “at the switched on port” has been deleted]

3.2
input return loss
$L_{ret(in)}$
ratio of the incident power at the input port to the reflected power at the input port

[SOURCE: IEC 60747-16-6:2019, 3.4]

3.3
output return loss
$L_{ret(out)}$
ratio of the incident power at the output port to the reflected power at the output port

[SOURCE: IEC 60747-16-6:2019, 3.5]

3.4
input power at 1dB compression
$P_{i(1dB)}$
input power where the insertion loss increases by 1 dB compared with insertion loss in linear region

[SOURCE: IEC 60747-16-4:2004, 3.4]

3.5
output power at 1dB compression
$P_{o(1dB)}$
output power where the insertion loss increases by 1 dB compared with insertion loss in linear region

[SOURCE: IEC 60747-16-4:2004, 3.5]

3.6
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]

3.7
power at the intercept point
$P_{n(IP)}$
<for intermodulation products> output power at intersection between the extrapolated output powers of the fundamental component and the n^{th} order intermodulation components, when the extrapolation is carried out in a diagram showing the output power of the components (in decibels) as a function of the input power (in decibels)

[SOURCE: IEC 60747-16-1:2001, 3.8]

3.8
output leakage power

3.8.1
leakage power for continuous wave
$P_{leak(cw)}$
output power at limiter off state

3.8.2
spike leakage power for pulse wave
$P_{\mathbf{leak(spike)}}$
instantaneous maximum output power at pulsed input power

3.8.3
flat leakage power for pulse wave
$P_{\mathbf{leak(flat)}}$
output power in constant region after pulse wave input

3.9
response time
$t_{\mathbf{res}}$
interval between the starting time of leakage and the staring time of the constant output voltage region

3.10
recovery time
$t_{\mathbf{rec}}$
time required for the insertion loss to recover within 3 dB after the large power input

4 Essential ratings and characteristics

4.1 General requirements

4.1.1 Circuit identification and types

The identification of type (device name), the category of circuit and technology applied shall be given.

4.1.2 General function description

A general description of the function performed by the microwave integrated circuit limiters and the features for the application shall be made.

4.1.3 Manufacturing technology

The manufacturing technology, e.g. semiconductor monolithic integrated circuit, thin film integrated circuit, micro-assembly, etc. shall be stated. This statement shall include details of the semiconductor technologies such as Schottky-barrier diode, PIN diode, transistor, etc.

IEC 60747-4 shall be referred to for terminology and letter symbols, essential ratings and characteristics and measuring methods of such microwave devices.

4.1.4 Package identification

The following statements shall be made:

a) chip or packaged form;

b) IEC and/or national reference number of the outline drawing, or drawing of non-standard package including terminal numbering;

c) principal package material, for example, metal, ceramic, plastic.

4.1.5 Main application

The main application should be stated, if necessary. If the device has restrictive applications, these should be stated here.