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FINAL VERSION

VERSION FINALE

Semiconductor devices – Discrete devices – Part 4: Microwave diodes and transistors

Dispositifs à semiconducteurs – Dispositifs discrets – Partie 4: Diodes et transistors hyperfréquences

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SEMICONDUCTOR DEVICES – DISCRETE DEVICES –

Part 4: Microwave diodes and transistors

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This Consolidated version of IEC 60747-4 bears the edition number 2.1. It consists of the second edition (2007-08) [documents 47E/330/FDIS and 47E/339/RVD] and its amendment 1 (2017-01) [documents 47E/499/CDV and 47E/517/RVC]. The technical content is identical to the base edition and its amendment.

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 60747-4 has been prepared by subcommittee 47E: Discrete semiconductor devices, of IEC technical committee 47: Semiconductor devices.

This second edition constitutes a technical revision.

The major technical changes with regard to the previous edition are as follows:

a) the clause of bipolar transistors has been added;
b) the clause of field-effect transistors has been amended.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The list of all parts of the IEC 60747 series, under the general title *Semiconductor devices – Discrete devices,* can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability 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- withdrawn,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.

SEMICONDUCTOR DEVICES – DISCRETE DEVICES –

Part 4: Microwave diodes and transistors

1 Scope

This part of IEC 60747 gives requirements for the following categories of discrete devices:

– variable capacitance diodes and snap-off diodes (for tuning, up-converter or harmonic multiplication, switching, limiting, phased shift, parametric amplification);
– mixer diodes and detector diodes;
– avalanche diodes (for direct harmonic generation, amplification);
– gunn diodes (for direct harmonic generation);
– bipolar transistors (for amplification, oscillation);
– field-effect transistors (for amplification, oscillation).

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

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

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

IEC 60747-8:2000, *Semiconductor devices – Part 8: Field-effect transistors*

3 Variable capacitance, snap-off diodes and fast-switching schottky diodes

3.1 Variable capacitance diodes

3.1.1 General

The provisions of this part deal with diodes (excluding snap-off diodes) in which the variable capacitance effect is used; they cover four applications: tuning, harmonic multiplication, switching (including limiting), parametric amplification.

The devices for these applications are defined as follows:

Diodes for tuning

Diodes which are used to vary the frequency of a tuned circuit. These diodes are usually characterized a frequency of resonance much higher than the frequency of use and have a known capacitance/voltage relationship.

Diodes for harmonic multiplication

These diodes must have a non-linear capacitance/voltage relationship at the frequency of