

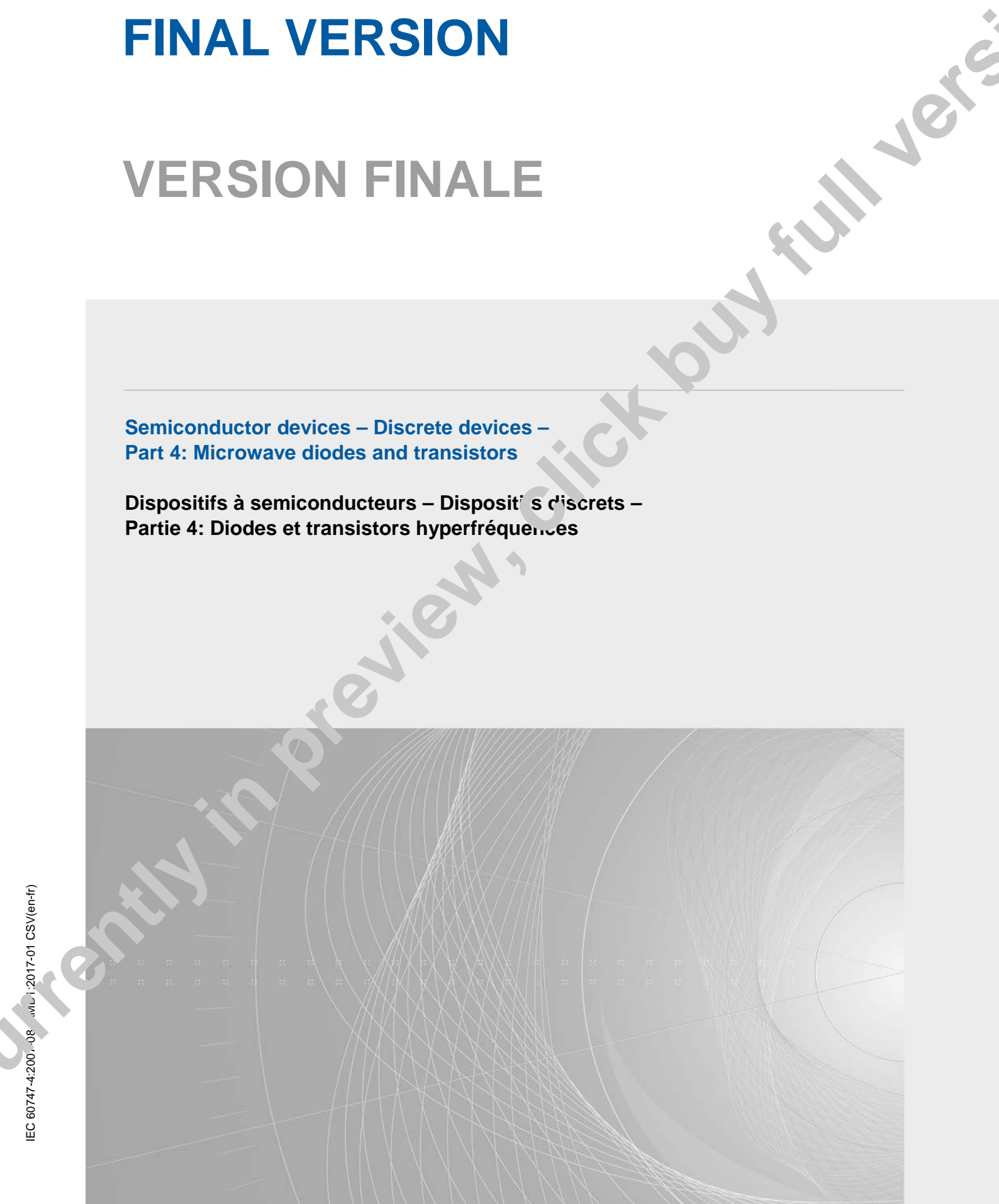
# FINAL VERSION

# VERSION FINALE

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

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



## CONTENTS

FOREWORD.....	6
1 Scope.....	8
2 Normative references .....	8
3 Variable capacitance, snap-off diodes and fast-switching schottky diodes .....	8
3.1 Variable capacitance diodes.....	8
3.1.1 General .....	8
3.1.2 Terminology and letter symbols .....	9
3.1.3 Essential ratings and characteristics.....	9
3.1.4 Measuring methods .....	12
3.2 Snap-off diodes, Schottky diodes .....	39
3.2.1 General .....	39
3.2.2 Terminology and letter symbols .....	39
3.2.3 Essential ratings and characteristics.....	39
3.2.4 Measuring methods .....	41
4 Mixer diodes and detector diodes .....	48
4.1 Mixer diodes used in radar applications .....	48
4.1.1 General .....	48
4.1.2 Terminology and letter symbols .....	48
4.1.3 Essential ratings and characteristics.....	48
4.1.4 Measuring methods .....	50
4.2 Mixer diodes used in communication applications.....	69
4.2.1 General .....	69
4.2.2 Terminology and letter symbols.....	69
4.2.3 Essential ratings and characteristics.....	69
4.2.4 Measuring methods.....	71
4.3 Detector diodes.....	71
5 Impatt diodes.....	71
5.1 Impatt diodes amplifiers.....	71
5.1.1 General.....	71
5.1.2 Terms and definitions .....	71
5.1.3 Essential ratings and characteristics.....	74
5.2 Impatt diode oscillators.....	77
6 Gunn diodes.....	77
6.1 General.....	77
6.2 Terms and definitions .....	78
6.3 Essential ratings and characteristics .....	78
6.4 Measuring methods.....	78
6.4.1 Pulse breakdown voltage $V_{(BR)}$ .....	78
6.4.2 Threshold voltage.....	79
6.4.3 Resistance .....	80
7 Bipolar transistors .....	81
7.1 General.....	81
7.2 Terms and definitions .....	81
7.3 Essential ratings and characteristics .....	84
7.3.1 General .....	84
7.3.2 Limiting values (absolute maximum rating system) .....	84

7.4	Measuring methods .....	87
7.4.1	General .....	87
7.4.2	DC characteristics .....	89
7.4.3	RF characteristics .....	89
7.5	Verifying methods .....	103
7.5.1	Load mismatch tolerance ( $\Psi_L$ ) .....	103
7.5.2	Source mismatch tolerance ( $\Psi_S$ ) .....	106
7.5.3	Load mismatch ruggedness ( $\Psi_R$ ) .....	110
8	Field-effect transistors .....	111
8.1	General .....	111
8.2	Terms and definitions .....	111
8.3	Essential ratings and characteristics .....	114
8.3.1	General .....	114
8.3.2	Limiting values (absolute maximum rating system) .....	115
8.4	Measuring methods .....	116
8.4.1	General .....	116
8.4.2	DC characteristics .....	117
8.4.3	RF characteristics .....	123
8.5	Verifying methods .....	134
8.5.1	Load mismatch tolerance ( $\Psi_L$ ) .....	134
8.5.2	Source mismatch tolerance ( $\Psi_S$ ) .....	134
8.5.3	Load mismatch ruggedness ( $\Psi_R$ ) .....	134
9	Assessment and reliability – specific requirements .....	134
9.1	Electrical test conditions .....	134
9.2	Failure criteria and failure-defining characteristics for acceptance tests .....	134
9.3	Failure criteria and failure-defining characteristics for reliability tests .....	134
9.4	Procedure in case of a testing error .....	134
	Figure 1 – Equivalent circuit .....	12
	Figure 2 – Circuit for the measurement of reverse current $I_R$ .....	12
	Figure 3 – Circuit for the measurement of forward voltage $V_F$ .....	13
	Figure 4 – Circuit for the measurement of capacitance $C_{tot}$ .....	14
	Figure 5 – Circuit for the measurement of effective quality factor .....	15
	Figure 6 – Circuit for the measurement of series inductance .....	17
	Figure 7 – Circuit for the measurement of thermal resistance $R_{th}$ .....	18
	Figure 8 – Circuit for the measurement of transient thermal impedance $Z_{th}$ .....	19
	Figure 9 – Waveguide mounting .....	21
	Figure 10 – Equivalent circuit of mounted diode .....	21
	Figure 11 – Block diagram of transmission loss measurement circuit .....	22
	Figure 12 – Curve indicating transmitted power versus frequency .....	24
	Figure 13 – Example of cavity .....	26
	Figure 14 – Block diagram for the measurement of effective Q in cavity method .....	28

Figure 15 – Block diagram of transformed impedance measurement circuit.....	35
Figure 16 – Example of plot of diode impedance as a function of bias.....	36
Figure 17 – Modified Smith Chart indicating constant $Q$ and constant $R$ circles.....	38
Figure 18 – Transition time $t_t$ .....	39
Figure 19 – Circuit for the measurement of transition time ( $t_t$ ) .....	41
Figure 20 – The time interval ( $t_{t1}$ ) .....	43
Figure 21 – Circuit for the measurement of reverse recovery time.....	43
Figure 22 – The reverse recovery time $t_{rr}$ .....	44
Figure 23 – Circuit for the measurement of the excess carrier effective lifetime .....	45
Figure 24 – Circuit for the measurement of the excess carrier effective lifetime .....	46
Figure 25 – the ratio of $i_{pr}$ to $i_{pf}$ .....	47
Figure 26 – Circuit for the measurement of forward current ( $I_F$ ).....	50
Figure 27 – Circuit for the measurement of rectified current ( $I_0$ ) .....	51
Figure 28 – Circuit for the measurement of intermediate frequency impedance ( $Z_f$ ) in the method 1.....	52
Figure 29 – Circuit for the measurement of intermediate frequency impedance ( $Z_{if}$ ) in the method 2.....	53
Figure 30 – Circuit for the measurement of voltage standing wave ratio.....	55
Figure 31 – Circuit for the measurement of overall noise factor.....	57
Figure 32 – Circuit for the measurement of output noise ratio .....	61
Figure 33 – Circuit for the measurement of conversion loss in dc incremental method .....	63
Figure 34 – Circuit for the measurement of conversion loss in amplitude modulation method .....	64
Figure 35 – Block diagram of burnout energy measurement circuit.....	65
Figure 36 – Circuit for the measurement of pulse breakdown voltage.....	78
Figure 37 – Circuit for the measurement of threshold voltage.....	79
Figure 38 – Circuit for the measurement of resistance in voltmeter-ammeter method.....	80
Figure 39 – Circuit for the measurement of resistance in alternative method.....	81
Figure 40 – Circuit for the measurement of scattering parameters .....	91
Figure 41 – Incident and reflected waves in a two-port network .....	92
Figure 42 – Circuit for the measurements of two-tone intermodulation distortion .....	98
Figure 43 – Example of third order intermodulation products indicated by the spectrum analyser.....	100
Figure 44 – Typical intermodulation products output power characteristic .....	102
Figure 45 – Circuit for the verification of load mismatch tolerance in the method 1.....	103
Figure 46 – Circuit for the verification of load mismatch tolerance in the method 2.....	105
Figure 47 – Circuit for the verification of source mismatch tolerance in the method 1.....	107

Figure 48 – Circuit for the verification of source mismatch tolerance in the method 2.....	109
Figure 49 – Circuit for the verification of load mismatch ruggedness.....	110
Figure 50 – Circuit for the measurements of gate-source breakdown voltage, $V_{(BR)GSO}$ .....	118
Figure 51 – Circuit for the measurements of gate-drain breakdown voltage, $V_{(BR)GDO}$ .....	118
Figure 52 – Circuit for the measurement of thermal resistance, channel-to-case.....	119
Figure 53 – Timing chart of DC pulse to be supplied to the device being measured.....	121
Figure 54 – Calibration curve $V_{GSF} = f(T_{ch})$ for fixed $I_{G(ref)}$ , evaluation of $\alpha$ .....	122
Figure 55 – $V_{GSF2}$ in function of delay time $\tau_4$ .....	123
Figure 56 – Circuit for the measurement of output power at specified input power.....	124
Figure 57 – Circuit for the measurements of the noise figure and associated gain.....	127
Table 1 – Electrical limiting values.....	84
Table 2 – DC characteristics.....	85
Table 3 – RF characteristics.....	86
Table 4 – Replacing rule for terms.....	87
Table 5 – Replacing rule for symbols in the case of constant base current.....	88
Table 6 – Replacing rule for symbols in the case of constant base voltage.....	88
Table 7 – Electrical limiting values.....	115
Table 8 – DC characteristics.....	115
Table 9 – RF characteristics.....	116
Table 10 – Replacing rules for terms.....	117
Table 11 – Replacing rules for symbols.....	117
Table 12 – Operating conditions and Test circuit.....	135
Table 13 – Failure criteria and measurement conditions.....	137

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**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