INTERNATIONAL STANDARD

IEC 60747-1

Second edition 2006-02

Semiconductor devices -

Part 1: General

© IEC 2006 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

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



CONTENTS

FOI	REWC)RD	4	
1	Scop	e	6	
2	Norm	ative references	6	
3	Terms and definitions			
	3.1	Device structure	6	
	3.2	Elements and circuits	7	
	3.3	Thermal characteristics	8	
	3.4	Noise	9	
	3.5	Conversion loss	9	
	3.6	Stability of characteristics	10	
4	Lette	r symbols	10	
	4.1	General	10	
	4.2	Letter symbols for currents, voltages and powers	11	
	4.3	Letter symbols for signal ratios expressed in dB	13	
	4.4	Letter symbols for other electrical properties	14	
	4.5	Letter symbols for other properties	15	
	4.6	Presentation of limit values	17	
5	Essential ratings and characteristics			
	5.1	General	18	
	5.2	Relationship between conditions of use, ratings and characteristics	18	
	5.3	Standard format for the presentation of published data	19	
	5.4	Type identification	19	
	5.5	Terminal and polarity identification	19	
	5.6	Electrical ratings and characteristics		
	5.7	Cooling conditions		
	5.8	Recommended temperatures		
	5.9	Recommended voltages and currents		
	5.10	Mechanical ratings (limiting values)		
	5.11	Mechanical characteristics		
		Multiple devices having a common encapsulation		
6	Measuring methods			
	6.1	General		
	6.2	Alternative methods of measurement		
	6.3	Measurement accuracy		
	6.4	Protection of devices and measuring equipment		
	6.5	Thermal conditions for measuring methods		
_	6.6	Accuracy of measuring circuits		
7	Acceptance and reliability of discrete devices			
	7.1	General		
_	7.2	Electrical endurance tests		
8	Electrostatic-sensitive devices			
	8.1	Label and symbol	31	
	8.2	Test methods for semiconductor devices sensitive to voltage pulses of short duration	20	
		นนเสแบท	J∠	

9	Product discontinuance notification		
	9.1	Definitions	32
	9.2	General aspects for discontinuation	33
	9.3	Information for the discontinuance notification	33
	9.4	Notification	33
	9.5	Retention	34
Anı	nex A	(informative) Presentation of IEC 60747 and IEC 60748	35
Anı	nex B	(informative) Clause cross-references from the previous edition of IEC 60747-1.	39
Bib	liogra	phy	
Fig	ure 1	- Example of the application of the rules to a periodic current	11
Fig	ure 2	- Derating curve	28
Fig har	ure 3 ndling	- Symbol to be used for the electrostatic sensitive devices that require special	31
Tal	ala 1	Dresontation of limit values with the two conventions	4.0
		- Presentation of limit values with the two conventions	
ıat	ole 2 -	- Failure rate operating conditions	29

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES -

Part 1: General

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60747-1 has been prepared by IEC technical committee 47: Semiconductor devices.

This second edition of IEC 60747-1 cancels and replaces the first edition (1983) and its amendments 1 (1991), 2 (1993) and 3 (1996).

The main changes with respect to the previous edition are listed below.

- a) The terminology which is now given in the IEV (or which was in conflict with the IEV) has been omitted.
- b) There has been a general revision of guidance on essential ratings and characteristics.
- c) The distinction between general and reference methods of measurement has been removed.
- d) A clause on product discontinuation notice has been added.

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

FDIS	Report on voting
47/1841/FDIS	47/1848/RVD

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

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

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

The committee has decided that the contents of this 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.

A bilingual version of this publication may be issued at a later date.

The contents of the corrigendum of September 2008 have been included in this copy.

SEMICONDUCTOR DEVICES -

Part 1: General

1 Scope

This part of IEC 60747 gives the general requirements applicable to the discrete semiconductor devices and integrated circuits covered by the other parts of IEC 60747 and IEC 60748 (see Annex A).

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 60027 (all parts), Letter symbols to be used in electrical technology

IEC 60050-521, International Electrotechnical Vocabulary (IEV) – Part 521: Semiconductor devices and integrated circuits

IEC 60050-702, International Electrotechnical Vocabulary (IEV) – Part 702: Oscillations, signals and related devices

IEC 60068 (all parts), Environmental testing

IEC 60191-2, Mechanical standardization of semiconductor devices - Part 2: Dimensions

IEC 60747 (all parts), Semiconductor devices

IEC 60748 (all parts), Semiconductor devices – Integrated circuits

IEC 60749-26, Semiconductor devices – Mechanical and climatic test methods – Part 26: Electrostatic discharge (ESD) sensitivity testing – Human body model (HBM)

IEC 61340 (all parts), Electrostatics

QC 001002 (all parts), IEC Quality Assessment Systems for Electronic Components (IECQ) – Rules of procedure

ISO 9000, Quality management systems – Fundamentals and vocabulary