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Standards

Irish Standard
I.S. EN IEC 63287-1:2021

Semiconductor devices - Generic semiconductor qualification guidelines - Part 1: Guidelines for IC reliability qualification

I.S. EN IEC 63287-1:2021

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National Foreword

I.S. EN IEC 63287-1:2021 is the adopted Irish version of the European Document EN IEC 63287-1:2021, Semiconductor devices - Generic semiconductor qualification guidelines - Part 1: Guidelines for IC reliability qualification

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EUROPEAN STANDARD

EN IEC 63287-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2021

ICS 31.080.01

English Version

**Semiconductor devices - Generic semiconductor qualification
guidelines - Part 1: Guidelines for IC reliability qualification
(IEC 63287-1:2021)**

Dispositifs à semiconducteurs - Lignes directrices
génériques concernant la qualification des semiconducteurs
- Partie 1: Lignes directrices concernant la qualification de
la fiabilité des circuits intégrés
(IEC 63287-1:2021)

Halbleiterbauelemente - Allgemeine Leitlinien für die
Qualifikation von Halbleitern - Teil 1: Leitlinien für die IC-
Zuverlässigkeitsqualifikation
(IEC 63287-1:2021)

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 63287-1:2021 (E)

European foreword

The text of document 47/2703/FDIS, future edition 1 of IEC 63287-1, prepared by IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 63287-1:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-06-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-09-29

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068-2-1 NOTE Harmonized as EN 60068-2-1

IEC 60068-2-30 NOTE Harmonized as EN 60068-2-30

IEC 60749-11 NOTE Harmonized as EN 60749-11

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60749-5	-	Semiconductor devices - Mechanical and climatic test methods - Part 5: Steady-state temperature humidity bias life test	EN 60749-5	-
IEC 60749-6	-	Semiconductor devices - Mechanical and climatic test methods - Part 6: Storage at high temperature	EN 60749-6	-
IEC 60749-15	-	Semiconductor devices - Mechanical and climatic test methods - Part 15: Resistance to soldering temperature for through-hole mounted devices	EN IEC 60749-15	-
IEC 60749-20	-	Semiconductor devices - Mechanical and climatic test methods - Part 20: Resistance of plastic encapsulated SMDs to the combined effect of moisture and soldering heat	EN IEC 60749-20	-
IEC 60749-21	-	Semiconductor devices - Mechanical and climatic test methods - Part 21: Solderability	EN 60749-21	-
IEC 60749-23	-	Semiconductor devices - Mechanical and climatic test methods - Part 23: High temperature operating life	EN 60749-23	-
IEC 60749-25	-	Semiconductor devices - Mechanical and climatic test methods - Part 25: Temperature cycling	EN 60749-25	-
IEC 60749-26	-	Semiconductor devices - Mechanical and climatic test methods - Part 26: Electrostatic discharge (ESD) sensitivity testing - Human body model (HBM)	EN IEC 60749-26	-
IEC 60749-28	-	Semiconductor devices - Mechanical and climatic test methods - Part 28: Electrostatic discharge (ESD) sensitivity testing - Charged device model (CDM) - device level	EN 60749-28	-
IEC 60749-29	-	Semiconductor devices - Mechanical and climatic test methods - Part 29: Latch-up test	EN 60749-29	-

EN IEC 63287-1:2021 (E)

IEC 60749-42 - Semiconductor devices - Mechanical andEN 60749-42 -
climatic test methods - Part 42:
Temperature and humidity storage



IEC 63287-1

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INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Semiconductor devices – Generic semiconductor qualification guidelines –
Part 1: Guidelines for IC reliability qualification**

**Dispositifs à semiconducteurs – Lignes directrices génériques concernant la
qualification des semiconducteurs –
Partie 1: Lignes directrices concernant la qualification de la fiabilité des circuits
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Edition 1.0 2021-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Semiconductor devices – Generic semiconductor qualification guidelines –
Part 1: Guidelines for IC reliability qualification**

**Dispositifs à semiconducteurs – Lignes directrices génériques concernant la
qualification des semiconducteurs –
Partie 1: Lignes directrices concernant la qualification de la fiabilité des circuits
intégrés**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES – GENERIC SEMICONDUCTOR QUALIFICATION GUIDELINES –

Part 1: Guidelines for IC reliability qualification

FOREWORD

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International Standard IEC 63287-1 has been prepared by IEC technical committee 47: Semiconductor devices.

This first edition of IEC 63287-1 cancels and replaces the first edition of IEC 60749-43 published in 2017. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) the document has been renamed and renumbered to distinguish it from the IEC 60749 (all parts);
- b) a new section concerning the concept of "family" has been added with appropriate renumbering of the existing text.

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

DRAFT	Report on voting
47/2703/FDIS	47/2720/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/standardsdev/publications.

A list of all parts in the IEC 63287 series, published under the general title *Semiconductor, devices – Generic semiconductor qualification guidelines*, can be found on the IEC website.

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INTRODUCTION

This document provides guidelines for semiconductor IC vendors in the preparation of detailed reliability test plans for device qualification. Such plans are intended to be prepared before commencing qualification tests and after consultation with the user of their semiconductor integrated circuit product.

The guideline gives some examples for creating reliability qualification test plans to determine appropriate reliability test conditions based on the use conditions and requirements for each application of semiconductor integrated circuits. Categories are set for automotive applications and for general applications as a target of reliability. The grade for automotive use is further classified into two grades according to applications. The guideline assumes annual operating hours, useful life, etc. for each grade, and defines the verification methods for early failure rate and wear-out failure to propose appropriate reliability tests, and at the same time, presents concepts to properly ensure the quality of semiconductor integrated circuits using screening techniques which are designed to reduce the early failure rate.

The test conditions and the values of acceleration factors presented in this guideline are shown to provide examples of calculations for obtaining reliability test conditions in order to verify the required quality standards and are not designed to define the standards to ensure reliability of semiconductor integrated circuits.

NOTE Qualification tests are tests in which the semiconductor vendor takes account of the reliability required by its product users.

SEMICONDUCTOR DEVICES – GENERIC SEMICONDUCTOR QUALIFICATION GUIDELINES –

Part 1: Guidelines for IC reliability qualification

1 Scope

This part of IEC 63287 gives guidelines for reliability qualification plans of semiconductor integrated circuit products. This document is not intended for military- and space-related applications.

NOTE 1 The manufacturer can use flexible sample sizes to reduce cost and maintain reasonable reliability by this guideline adaptation based on EDR-4708, AEC Q100, JESD47 or other relevant document can also be applicable if it is specified.

NOTE 2 The Weibull distribution method used in this document is one of several methods to calculate the appropriate sample size and test conditions of a given reliability project.

2 Normative references

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IEC 60749-6, *Semiconductor devices – Mechanical and climatic test methods – Part 6: Storage at high temperature*

IEC 60749-15, *Semiconductor devices – Mechanical and climatic test methods – Part 15: Resistance to soldering temperature for through-hole mounted devices*

IEC 60749-20, *Semiconductor devices – Mechanical and climatic test methods – Part 20: Resistance of plastic encapsulated SMDs to the combined effect of moisture and soldering heat*

IEC 60749-21, *Semiconductor devices – Mechanical and climatic test methods – Part 21: Solderability*

IEC 60749-23, *Semiconductor devices – Mechanical and climatic test methods – Part 23: High temperature operating life*

IEC 60749-25, *Semiconductor devices – Mechanical and climatic test methods – Part 25: Temperature cycling*

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

IEC 60749-28, *Semiconductor devices – Mechanical and climatic test methods – Part 28: Electrostatic discharge (ESD) sensitivity testing – Charged device model (CDM) – Device level*

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