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Standards

Irish Standard
I.S. EN 60749-27:2006

Semiconductor devices - Mechanical
and climatic test methods -- Part 27:
Electrostatic discharge (ESD) sensitivity
testing - Machine model (MM) (IEC
60749-27:2006 (EQV))

I.S. EN 60749-27:2006

Incorporating amendments/corrigenda issued since publication:

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**Semiconductor devices -
Mechanical and climatic test methods -
Part 27: Electrostatic discharge (ESD) sensitivity testing -
Machine model (MM)
(IEC 60749-27:2006/A1:2012)**

Dispositifs à semiconducteurs -
Méthodes d'essais mécaniques
et climatiques -
Partie 27: Essai de sensibilité
aux décharges électrostatiques (DES) -
Modèle de machine (MM)
(CEI 60749-27:2006/A1:2012)

Halbleiterbauelemente -
Mechanische und klimatische
Prüfverfahren -
Teil 27: Prüfung der Empfindlichkeit gegen
elektrostatische Entladungen (ESD) -
Machine Model (MM)
(IEC 60749-27:2006/A1:2012)

This amendment A1 modifies the European Standard EN 60749-27:2006; it was approved by CENELEC on 2012-10-30. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 47/2135/FDIS, future amendment 1 to edition 2 of IEC 60749-27, prepared by IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60749-27:2006/A1:2012.

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) 2013-07-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-10-30

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The text of the International Standard IEC 60749-27:2006/A1:2012 was approved by CENELEC as a European Standard without any modification.

English version

**Semiconductor devices -
Mechanical and climatic test methods
Part 27: Electrostatic discharge (ESD) sensitivity testing -
Machine model (MM)
(IEC 60749-27:2006)**

Dispositifs à semiconducteurs -
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Halbleiterbauelemente -
Mechanische und klimatische
Prüfverfahren
Teil 27: Prüfung der Empfindlichkeit
gegen elektrostatische Entladungen
(ESD) -
Machine Model (MM)
(IEC 60749-27:2006)

This European Standard was approved by CENELEC on 2006-08-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

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- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2009-08-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60749-27:2006 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61340-3-2	- ¹⁾	Electrostatics Part 3-2: Methods for simulation of electrostatic effects - Machine model (MM) - Component testing	EN 61340-3-2	2002 ²⁾
IEC 60749-26	- ¹⁾	Semiconductor devices - Mechanical and climatic test methods Part 26: Electrostatic discharge (ESD) sensitivity testing - Human body model (HBM)	EN 60749-26	2006 ²⁾

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SEMICONDUCTOR DEVICES –
MECHANICAL AND CLIMATIC TEST METHODS –**

**Part 27: Electrostatic discharge (ESD) sensitivity testing –
Machine model (MM)**

FOREWORD

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This consolidated version of IEC 60749-27 consists of the second edition (2006) [documents 47/1861/FDIS and 47/1873/RVD] and its amendment 1 (2012) [documents 47/2135/FDIS and 47/2144/RVD]. It bears the edition number 2.1.

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.

International Standard IEC 60749-27 has been prepared by IEC technical committee 47: Semiconductor devices.

This second edition cancels and replaces the first edition, published in 2003, and has been revised in collaboration with technical committee 101. Whilst it does not contain any major technical changes, reference is now made, where necessary, to IEC 61340-3-2.

A list of all parts of IEC 60749 series, under the general title *Semiconductor devices – Mechanical and climatic test methods* can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendments 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.

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 27: Electrostatic discharge (ESD) sensitivity testing – Machine model (MM)

1 Scope

This part of IEC 60749 establishes a standard procedure for testing and classifying semiconductor devices according to their susceptibility to damage or degradation by exposure to a defined machine model (MM) electrostatic discharge (ESD). It may be used as an alternative test method to the human body model ESD test method. The objective is to provide reliable, repeatable ESD test results so that accurate classifications can be performed.

This test method is applicable to all semiconductor devices and is classified as destructive.

ESD testing of semiconductor devices is selected from this test method, the human body model (HBM – see IEC 60749-26) or other test methods in the IEC 60749 series. The MM and HBM test methods produce similar but not identical results. Unless otherwise specified, the HBM test method is the one selected.

NOTE 1 This test method does not truly simulate discharge from real machines or metallic tools because the test method uses high parasitic inductance of the test circuit, whereas real machines and metallic tools, whose discharge rise time is approximately 100 ps, have no inductance.

NOTE 2 Certain clauses in this test method are in accordance with IEC 61340-3-2.

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 61340-3-2, *Electrostatics – Part 3-2: Methods for simulation of electrostatic effects – Machine model (MM – Component testing) electrostatic discharge test waveforms*

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

3 Terms and definitions

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

3.1 device under test DUT

semiconductor product subjected to MM ESD test

3.2 DUT failure

condition in which a DUT does not meet one or more specified parameters as a result of ESD test

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