

Semiconductor devices - Mechanical and climatic test methods -- Part 37: Board level drop test method using an accelerometer

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 60749-37:2008 sisaldab Euroopa standardi EN 60749-37:2008 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 21.05.2008 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

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Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 60749-37:2008 consists of the English text of the European standard EN 60749-37:2008.

This standard is ratified with the order of Estonian Centre for Standardisation dated 21.05.2008 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

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Võtmesõnad:

Standardite reprodutseerimis- ja levitamisoigus kuulub Eesti Standardikeskusele

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Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

**Semiconductor devices -
Mechanical and climatic test methods -
Part 37: Board level drop test method using an accelerometer
(IEC 60749-37:2008)**

Dispositifs à semiconducteurs -
Méthodes d'essais mécaniques
et climatiques -
Partie 37: Méthode d'essai
de chute au niveau de la carte
avec utilisation d'un accéléromètre
(CEI 60749-37:2008)

Halbleiterbauelemente -
Mechanische und
klimatische Prüfverfahren -
Teil 37: Prüfverfahren Fall
der Leiterplatte unter Verwendung
eines Beschleunigungs-Messgerätes
(IEC 60749-37:2008)

This European Standard was approved by CENELEC on 2008-03-01. 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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 47/1937/FDIS, future edition 1 of IEC 60749-37, prepared by IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60749-37 on 2008-03-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2008-12-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2011-03-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60749-37:2008 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 60749-10	2002	Semiconductor devices - Mechanical and climatic test methods - Part 10: Mechanical shock	EN 60749-10	2002
IEC 60749-20	- ¹⁾	Semiconductor devices - Mechanical and climatic test methods - Part 20: Resistance of plastic-encapsulated SMDs to the combined effect of moisture and soldering heat	EN 60749-20	2003 ²⁾
IEC 60749-20-1	- ³⁾	Semiconductor devices - Mechanical and climatic test methods - Part 20-1: Handling, packing, labelling and shipping of surface mount devices sensitive to the combined effect of moisture and soldering heat	-	-

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

³⁾ At draft stage.

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INTRODUCTION

Handheld electronic products fit into the consumer and portable market segments. Included in handheld electronic products are cameras, calculators, cell phones, cordless phones, pagers, palm size PCs, personal computer memory card international association (PCMCIA) cards, smart cards, personal digital assistants (PDAs) and other electronic products that can be conveniently stored in a pocket and used while held in user's hand.

These handheld electronic products are more prone to being dropped during their useful service life because of their size and weight. This dropping event can not only cause mechanical failures in the housing of the device but also create electrical failures in the printed circuit board (PCB) assemblies mounted inside the housing due to transfer of energy through PCB supports. The electrical failures may result from various failure modes such as cracking of the circuit board, track cracking on the board, cracking of solder interconnections between the components and the board, and component cracks. The primary driver of these failures is excessive flexing of the circuit board due to input acceleration to the board created from dropping the handheld electronic product. This flexing of the board causes relative motion between the board and the components mounted on it, resulting in component, interconnect or board failures. The failure is a function of the combination of the board design, construction, material, thickness and surface finish; interconnect material and standoff height and component size.

Correlation between test and field conditions is not yet fully established. Consequently, the test procedure is presently more appropriate for relative component performance than for use as a pass/fail criterion. Rather, results should be used to augment existing data or establish a baseline for potential investigative efforts in package/board technologies.

The comparability between different test sites, data acquisition methods, and board manufacturers has not been fully demonstrated by existing data. As a result, if the data are to be used for direct comparison of component performance, matching studies must first be performed to prove that the data are in fact comparable across different test sites and test conditions.

This method is not intended to substitute for full characterization testing, which might incorporate substantially larger sample sizes and increased number of drops. Due to limited sample size and number of drops specified here, it is possible that enough failure data may not be generated in every case to perform full statistical analysis.

SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 37: Board level drop test method using an accelerometer

1 Scope and object

This part of IEC 60749 provides a test method that is intended to evaluate and compare drop performance of surface mount electronic components for handheld electronic product applications in an accelerated test environment, where excessive flexure of a circuit board causes product failure. The purpose is to standardize the test board and test methodology to provide a reproducible assessment of the drop test performance of surface-mounted components while producing the same failure modes normally observed during product level test.

The purpose of this standard is to prescribe a standardized test method and reporting procedure. This is not a component qualification test and is not meant to replace any system level drop test that may be needed to qualify a specific handheld electronic product. The standard is not meant to cover the drop test required to simulate shipping and handling-related shock of electronic components or PCB assemblies. These requirements are already addressed in test methods such as IEC 60749-10. The method is applicable to both area array and perimeter-leaded surface mounted packages.

This test method uses an accelerometer to measure the mechanical shock duration and magnitude applied which is proportional to the stress on a given component mounted on a standard board. The test method described in the future IEC 60749-40¹ uses strain gauge to measure the strain and strain rate of a board in the vicinity of a component. The detailed specification states which test method is to be used.

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 60749-10:2002, *Semiconductor devices – Mechanical and climatic test methods – Part 10: Mechanical shock*

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 60749-20-1, *Semiconductor devices – Mechanical and climatic test methods – Part 20-1: Handling, packing, labelling and shipping of surface-mount devices sensitive to the combined effect of moisture and soldering heat*²

3 Terms and definitions

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

¹ Under consideration.

² In preparation.