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Electronic components - Long-term storage of electronic semiconductor devices - Part 4: Storage

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 62435-4:2018 sisaldab Euroopa standardi EN IEC 62435-4:2018 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 62435-4:2018 consists of the English text of the European standard EN IEC 62435-4:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 17.08.2018.	Date of Availability of the European standard is 17.08.2018.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

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ICS 31.020

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English Version

Electronic components - Long-term storage of electronic semiconductor devices - Part 4: Storage (IEC 62435-4:2018)

Composants électroniques - Stockage de longue durée des dispositifs électroniques à semiconducteurs - Part 4: Stockage
(IEC 62435-4:2018)

Elektronische Bauteile - Langzeitlagerung elektronischer Halbleiterbauelemente - Teil 4: Lagerung
(IEC 62435-4:2018)

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

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

European foreword

The text of document 47/2469/FDIS, future edition 1 of IEC 62435-4, prepared by IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62435-4:2018.

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) 2019-04-10
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-07-10

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Endorsement notice

The text of the International Standard IEC 62435-4:2018 was approved by CENELEC as a European Standard without any modification.

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

IEC 60068-2-17	NOTE Harmonized as EN 60068-2-17
IEC 60721-3-1	NOTE Harmonized as EN IEC 60721-3-1
IEC 60749-30	NOTE Harmonized as EN 60749-30
IEC 61340-5-1	NOTE Harmonized as EN 61340-5-1
IEC 61340-5-3	NOTE Harmonized as EN 61340-5-3
IEC 61760-2	NOTE Harmonized as EN 61760-2
IEC 62258 series	NOTE Harmonized as EN 62258 series
IEC 62435 series	NOTE Harmonized as EN 62435 series
IEC 62435-2	NOTE Harmonized as EN 62435-2

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 When 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 60749-20-1	-	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	EN 60749-20-1	-
IEC/TR 61340-5-2	-	Electrostatics -- Part 5-2: Protection of electronic devices from electrostatic phenomena - User guide	CLC/TR 61340-5-2	-
IEC/TR 62258-3	-	Semiconductor die products -- Part 3:- Recommendations for good practice in handling, packing and storage		-
JEDEC J-STD-033	-	Standard for handling, packing, shipping, and use of moisture/reflow sensitive surface mount devices		
MIL-PRF-27401	-	Propellant pressurizing agent nitrogen		
MIL-PRF-81705	-	ESD Materials, Bags and Performance Specification		

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRONIC COMPONENTS – LONG-TERM STORAGE
OF ELECTRONIC SEMICONDUCTOR DEVICES –**
Part 4: Storage
FOREWORD

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International Standard IEC 62435-4 has been prepared by IEC technical committee 47: Semiconductor devices.

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

FDIS	Report on voting
47/2469/FDIS	47/2486/RVD

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

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

A list of all parts in the IEC 62435 series, published under the general title *Electronic components – Long-term storage of electronic semiconductor devices*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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

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INTRODUCTION

This standard applies to the long-term storage of electronic components.

This is a standard for long-term storage (LTS) of electronic devices drawing on the best long-term storage practices currently known. For the purposes of this document, LTS is defined as any device storage whose duration may be more than 12 months for products scheduled for long duration storage. While intended to address the storage of unpackaged semiconductors and packaged electronic devices, nothing in this document precludes the storage of other items under the storage levels defined herein.

Although it has always existed to some extent, obsolescence of electronic components and particularly of integrated circuits, has become increasingly intense over the last few years.

Indeed, with the existing technological boom, the commercial life of a component has become very short compared with the life of industrial equipment such as that encountered in the aeronautical field, the railway industry or the energy sector.

The many solutions enabling obsolescence to be resolved are now identified. However, selection of one of these solutions should be preceded by a case-by-case technical and economic feasibility study, depending on whether storage is envisaged for field service or production, for example:

- remedial storage as soon as components are no longer marketed;
- preventative storage anticipating declaration of obsolescence.

Taking into account the expected life of some installations, sometimes covering several decades, the qualification times and the unavailability costs, which can also be very high, the solution to be adopted to resolve obsolescence should often be rapidly implemented. This is why the solution retained in most cases consists in systematically storing components which are in the process of becoming obsolescent.

The technical risks of this solution are, a priori, fairly low. However, it requires perfect mastery of the implemented process and especially of the storage environment, although this mastery becomes critical when it comes to long-term storage.

All handling, protection, storage and test operations are recommended to be performed according to the state of the art.

The application of the approach proposed in this document in no way guarantees that the stored components are in perfect operating condition at the end of this storage. It only comprises a means of minimizing potential and probable degradation factors.

Some electronic device users have the need to store electronic devices for long periods of time. Lifetime buys are commonly made to support production runs of assemblies that will exceed the production timeframe of their individual parts. This puts the user in a situation requiring careful and adequate storage of such parts to maintain the as-received solderability and to minimize any degradation effects to the part over time. Major degradation concerns are moisture, electrostatic fields, ultra-violet light, large variations in temperature, air-borne contaminants and outgassing.

Warranties and sparring also present a challenge for the user or repair agency, as some systems have been designated to be used for long periods of time, in some cases for up to 40 years or more. Some of the devices needed for repair of these systems will not be available from the original supplier for the lifetime of the system, or the spare assembly can be built with the original production run but then require long-term storage. This document was developed to provide a standard for storing electronic devices for long periods of time.

The storage of devices that are moisture sensitive but that do not need to be stored for long periods of time is dealt with in IEC TR 62258-3.

Long-term storage assumes that the device is going to be placed in uninterrupted storage for a number of years. It is essential that it be useable after storage. It is important that storage media and the local environment are considered together.

These guidelines do not imply any warranty of product or guarantee of operation beyond the storage time given by the manufacturer.

The IEC 62435 series is intended to ensure that adequate reliability is achieved for devices in user applications after long-term storage. Users are encouraged to request data from suppliers to applicable specifications to demonstrate a successful storage life as requested by the user. These standards are not intended to address built-in failure mechanisms that would take place regardless of storage conditions.

These standards are intended to give practical guidance on methods of long-duration storage of electronic components, where this is intentional or involves planned storage of a product for a number of years. Storage regimes for work-in-progress production are managed according to company internal process requirements and are not detailed in this series of standards.

The overall standard series is split into a number of parts. Parts 1 to 4 apply to any long-term storage and contain general requirements and guidance, whereas Parts 5 to 9 are specific to the type of product being stored.

Electronic components requiring different storage conditions are covered separately starting with Part 5.

The structure of the IEC 62435 series as currently planned consists of the following:

- Part 1 – General
- Part 2 – Deterioration mechanisms
- Part 3 – Data
- Part 4 – Storage
- Part 5 – Die and wafer devices
- Part 6 – Packaged or finished devices
- Part 7 – MEMS
- Part 8 – Passive electronic devices
- Part 9 – Special cases