

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Electronic components – Long-term storage of electronic semiconductor devices –
Part 3: Data**

**Composants électroniques – Stockage de longue durée des dispositifs
électroniques à semiconducteurs –
Partie 3: Données**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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OF ELECTRONIC SEMICONDUCTOR DEVICES –****Part 3: Data****FOREWORD**

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International Standard IEC 62435-3 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
47/2608/FDIS	47/2615/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- withdrawn,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.

INTRODUCTION

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

This document deals with the 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 can be more than 12 months for product 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, selecting 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;
- preventive 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 well exceed the production timeframe of its individual parts. This puts the user in a situation requiring careful and adequate storage of such parts to maintain the as-received solderability and 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 sparing 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 may 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, the local environment and the associated part data be 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 guide to methods of long-duration storage of electronic components where this is intentional or planned storage of 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 IEC 62435 (all parts).

The overall standard 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

ELECTRONIC COMPONENTS – LONG-TERM STORAGE OF ELECTRONIC SEMICONDUCTOR DEVICES –

Part 3: Data

1 Scope

This part of IEC 62435 describes the aspects of data storage that are necessary for successful use of electronic components being stored after long periods while maintaining traceability or chain of custody. It defines what sort of data needs to be stored alongside the components or dies and the best way to do so in order to avoid losing data during the storage period. As defined in this document, long-term storage refers to a duration that can be more than twelve months for products scheduled for long duration storage. Philosophy, good working practice, and general means to facilitate the successful long-term-storage of electronic components are also addressed.

NOTE In IEC 62435 (all parts), the term "components" is used interchangeably with dice, wafers, passives and packaged devices.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 long-term storage LTS

planned storage of components to extend the lifecycle for a duration with the intention of supporting future use

Note 1 to entry: Allowable storage durations will vary by form factor (e.g. packing materials, shape) and storage conditions. In general, long-term storage is longer than 12 months.

Note 2 to entry: This note applies to the French language only.

[SOURCE: IEC 62435-1:2017, 3.1.2]

4 Data storage

4.1 General

Data associated with the electronic components that are stored shall itself be stored securely without degradation in order to be available when required during the entire storage period or longer, if specified. Data not currently required may be archived for future use and reassessment.