SLOVENSKI STANDARD
SIST-TS ES 59008-4-2:2007
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Data requirements for semiconductor die -- Part 4-2: Specific requirements and recommendations - Handling and storage

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Ta slovenski standard je istoveten z: ES 59008-4-2:2000

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ICS:

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2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN SPECIFICATION

SPÉCIFICATION EUROPÉENNE

EUROPÄISCHE SPEZIFIKATION

ES 59008-4-2

September 2000

English version

Data requirements for semiconductor die
Part 4-2: Specific requirements and recommendations
Handling and storage

This European Specification was approved by CENELEC on 2000-05-25.

CENELEC members are required to announce the existence of this ES in the same way as for an EN and to make the ES available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

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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

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Ref. No. ES 59008-4-2:2000 E

Foreword

This European Specification has been prepared by the CENELEC BTTF 97-1, Known good die.

It was submitted to the vote during the meeting of BTTF 97-1 and approved by CENELEC as ES 59008-4-2 on 2000-05-25.

The following date was fixed:

- latest date by which the existence of the ES has to be announced at national level (doa) 2000-10-01

The structure of this European Specification is as follows.

ES 59008 Data requirements for semiconductor die
- Part 1 General requirements
- Part 2 Vocabulary
- Part 3 Mechanical, material and connectivity requirements
- Part 4 Specific requirements and recommendations
  - Part 4-1: Test and quality
  - Part 4-2: Handling and storage
  - Part 4-3: Thermal
  - Part 4-4: Electrical simulation
- Part 5 Particular requirements and recommendations for die types
  - Part 5-1: Bare die
  - Part 5-2: Bare die with added connection structures
  - Part 5-3: Minimally-packaged die
- Part 6 Exchange data formats and data dictionary
  - Part 6-1: Data exchange - DDX file format
  - Part 6-2: Data dictionary

Introduction

This European Specification has been developed so that the selection of unpackaged and minimally packaged semiconductor die, with or without connection structures, can be carried out in a constructive way so that the designer and procurer of the components can save both design and procurement time.

It is a data specification which defines the requirements for :
- product identity
- product data
- die mechanical information
- test, quality and reliability information
- handling, storage and mounting information
- thermal data and electrical simulation data.

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This document was prepared by CENELEC Task Force CLC/BTTF 97-1 Known Good Die. Other organisations that helped prepare it were: the ESPRIT GOOD-DIE project, EECA, Sematech; DPC and EIAJ.

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The specification was derived from the work carried out in the ESPRIT 4th Framework project GOOD-DIE. This project was set up to develop a database for the selection of unpackaged and minimally packaged semiconductor die, with or without connection structures, and for the downloading of information to CAD design stations to facilitate the layout and simulation of MCMs and hybrid circuits. During the early part of this project the need became apparent for standard ways of presenting information for the selection and procurement of these components.

1 Scope

This series of European Specifications specifies requirements for the exchange of data pertaining to bare semiconductor die, with or without connection structures, and minimally packaged semiconductor die.

This Specification also gives recommendations for general industry good practice in the use of bare die with or without connection structures, and minimally-packaged die.

ES 59008-4-2 specifies the requirements for the exchange of data needed for delivery, specifically handling and storage of unpackaged and minimally packaged semiconductor die. The standard also specifies the requirements for the exchange of data to control product traceability and change notification. Recommendation for general industry good practice for handling, storage and labelling are contained in Parts 5-1, 5-2 and 5-3 of ES 59008.

This specification is for use by semiconductor manufacturers, suppliers, die processors and users of semiconductor die.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this European Specification. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this European Specification are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below.

ES 59008-1:1999, *Data requirements for semiconductor die -- Part 1: General requirements*

ES 59008-2:1999, *Data requirements for semiconductor die -- Part 2: Vocabulary*

ES 59008-3:1999, *Data requirements for semiconductor die -- Part 3: Mechanical, material and connectivity requirements*

prES 59008-5-1*, *Data requirements for semiconductor die -- Part 5-1: Particular requirements and recommendations for die types – Bare die*

prES 59008-5-2*, *Data requirements for semiconductor die -- Part 5-2: Particular requirements and recommendations for die types - Bare die with connection structures*

prES 59008-5-3*, *Data requirements for semiconductor die -- Part 5-3: Particular requirements and recommendations for die types – Minimally packaged die*

EIA/JESD49:1996, *Procurement Standard for Known Good Die (KGD)*

FED-STD-209, *Clean Room and Workstation Requirements, Controlled Environments*

3 Definitions

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For the purpose of this European Specification, the definitions as given in ES 59008-2 apply. In addition, the following terms are used in this part.

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3.1
primary packing
the packing material immediately surrounding the device. This applies to any of the packing forms including but not limited to chip trays, tape and reel or component tube

3.2
secondary packing
the packing material and method that contains one or more primary packing units. This packing material normally affords additional ESD, environmental and mechanical protection for devices during handling and shipping

* in preparation

4 Requirements

This Part 4-2 of ES 59008 shall be read in conjunction with ES 59008-1, ES 59008-3, ES 59008-5-1, ES 59008-5-2 and ES 59008-5-3.

5 Conformity levels

When any data are supplied which claim conformity to this specification, the level of conformity shall be stated as follows:

- Level 1: all data listed in 6.2, 7.2 and 8.2 have been included.
- Level 2: all data listed in 6.2, 6.3, 7.2, 7.3, 8.2 and 8.3 have been included.
- Level 3: all data listed in 6.2, 6.3, 6.4, 7.2, 7.3, 8.2 and 8.3 have been included.

Refer to Table 1 for specific requirements.

6 Requirements for invoicing, shipping and traceability

6.1 General

All shipping and handling methods shall provide a system for coding and maintaining traceability of each die to its wafer lot. Information supplied for traceability shall either be on the die device, primary or secondary packing, or on accompanying documentation including, where appropriate, invoices.

Unless uniquely identified, additional procedures and documentation may be required to maintain traceability once the die device has been removed from the primary packing.

All shipping methods shall provide protection from mechanical damage, electrostatic discharge, and contamination, while allowing recovery of die. If multiple units are shipped in the same package, such as a waffle pack or a wafer boat, means shall be provided to prevent any intermingling that could cause physical damage.

Each shipping method should also provide a means to prevent excessive movement or rotation of product such as may cause damage to or prevent the automated handling of the product.

Recommendations for good industry practice are contained in Parts 5-1, 5-2 and 5-3 of ES 59008.

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6.2 Essential information

In order to claim conformity with any of the levels 1, 2 or 3 all the information covered by subclauses under 6.2 shall be given as indicated by a figure 1 in the relevant column of Table 1.

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6.2.1 Customer part number

The part number designated and required by the customer where this is different from the type number or the manufacturers part number.

6.2.2 Type information

The type number or manufacturer part number and version number which, together, uniquely specify the die.

6.2.3 Supplier

The name of the supplier.

6.2.4 Manufacturer

The name of the manufacturer, if different to the supplier.

6.2.5 Traceability

The supplier fabrication lot number, or any other information necessary to uniquely link the die device, or batch of devices, to proper corresponding documentation from the wafer fabrication lot and/or test lot . This reference should be used for any communication between customer and supplier for product queries.

6.2.6 Quantity

The total quantity of die in the shipment and the breakdown of quantities in each packing unit such as waffle pack, tape or wafer. In the case of wafers, this quantity may be the number of good die on the wafer, referred to as the Wafer Count, which shall be accompanied by sort information.

6.2.7 Wafer map

Where die are provided in the form of a tested wafer, information shall be supplied to enable the user to identify good and reject die products, or grades of die products. This information may be supplied in the form of a wafer map showing the results from the test and uniquely identifying selected die on the wafer. A wafer map may be supplied in printed or electronic form. Alternatively, the wafer itself may be physically marked, for example by marking reject or secondary grade die by an ink dot, in which case a corresponding statement shall be made as to the meaning of the marks.

6.2.8 Purchase order traceability number

The purchase order traceability information allocated by the customer where applicable.

6.2.9 Die form

The form in which the die are provided, whether bare, bumped, with lead frame or minimally packaged

6.3 Desirable information

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The information covered by this subclause is important and should be supplied if at all possible. In order to claim conformity with either level 2 or 3 all the information covered by subclauses under 6.2 and 6.3 shall be given as indicated by a figure 1 or 2 in the relevant column of Table 1.

6.3.1 Wafer number

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The wafer number within the wafer fabrication lot (when required by the contractual agreement).

6.3.2 Packing form

The packing form used to supply the die, whether for a singulated die device or a wafer.

6.3.3 Date of manufacture

The date of manufacture being the date at which final wafer test is performed at the original manufacturer or the date at which the part is given a unique part number during the wafer manufacture.

6.4 Optional information

The information covered by this subclause should be supplied whenever it is applicable and available. In order to claim conformity with level 3 all the information covered by subclauses under 6.2, 6.3 and 6.4 shall be given as indicated by a figure 1, 2 or 3 in the relevant column of Table 1.

6.4.1 Special protection requirements

Description of any unique materials or exposed surfaces that may require special protection during handling. For example, some die devices should not be touched on the top surface or some die devices should not be exposed to UV light.

7 Requirements for packing and storage

7.1 General

Types of product covered by this specification are fragile and are susceptible to damage. Care needs to be exercised in handling and storing product to ensure minimal damage.

In all cases where materials are used in contact or surrounding die product, the material shall not cause damage to the die, either by mechanical, electrical or chemical means.

7.2 Essential information

In order to claim conformity with any level of this specification, all the information covered by subclauses under 7.2 shall be given as indicated by a figure 1 in the relevant column of Table 1.

7.2.1 Compliance with requirements of JEDEC 49

A statement to the effect that die are packed and stored in accordance with the requirements of JEDEC Std EIA/JESD 49 shall be given. Where this is not stated or where this standard has not been complied with, the conditions in which the product has been packed and stored shall be given.

7.3 Desirable information

The information covered by this subclause is important and should be given if at all possible. In order to claim conformity with either level 2 or 3 all the information covered by subclauses under 7.2 and 7.3 shall be given as indicated by a figure 1 or 2 in the relevant column of Table 1.

7.3.1 Storage and handling information

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Product specific information for proper storage and handling (e.g. ESD, sensitivity to light, atmosphere required upon opening, etc.).

7.3.2 Storage duration

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The maximum duration of storage, which shall be stated where the storage method is time limited.

8 Requirements for labelling

8.1 General

Labelling of primary and secondary packing shall provide information for product traceability and provide appropriate warnings of the container contents.

Bar coding, or other methods of providing information in a machine-readable form, may be used on the primary and secondary labels to give information required in this section as an aid to

material handling in a manufacturing environment. Where possible, industry standard coding should be used.

Recommendations for good industry practice are contained in Parts 5-1, 5-2 and 5-3 of ES 59008.

8.2 Essential information

In order to claim conformity with any level of this specification, all the information covered by subclauses under 8.2 shall be given as indicated by a figure 1 in the relevant column of Table 1.

8.2.1 Primary and secondary labelling

Information from appropriate items from 6.2.1 through 6.2.6 shall be included on both the primary and/or secondary labels as required to provide sufficient information to uniquely identify the accompanying documentation and uniquely identify the product in the container.

8.2.2 Traceability information on primary packing

Supplier traceability information as per 6.2.5 shall be included on the primary packing.

8.2.3 Unencapsulated die warning label

Information shall be given to indicate that the container is only opened in a contamination controlled area as classified by FED-STD-209, where the primary package contains unencapsulated die or wafers. This information shall be in the form of a warning label affixed to the primary packing.

8.2.4 Toxic material warning

Toxic material warning information shall be given in the form of a clearly identified label affixed to the primary and secondary packing label and detailed on all documentation, when the package contains toxic material

8.3 Desirable information

The information covered by this subclause is important and should be given if at all possible. In order to claim conformity with either level 2 or 3 all the information covered by subclauses under 8.2 and 8.3 shall be given as indicated by a figure 1 or 2 in the relevant column of Table 1.

8.3.1 Small or fragile components warning label

warning information, in the form of an appropriate warning label, should be included on the primary packing when the package contains very small or fragile components, such as unencapsulated die, which could easily be damaged when the container is opened.

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9 Requirements for environmental protection

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9.1 General

On request the supplier shall make a declaration that all relevant legal requirements have been met and shall detail appropriate measures taken to protect the environment.

Consideration shall also be given to the recycling of packing materials, reuse of packing materials and the control of toxic materials

Guidance for good practice for environmental protection is given in annex A.