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DATA REQUIREMENTS FOR SEMICONDUCTOR DIE

PART 5-3: PARTICULAR REQUIREMENTS AND RECOMMENDATIONS FOR DIE TYPES - MINIMALLY-PACKAGED DIE

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EUROPEAN SPECIFICATION **ES 59008-5-3**

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English version

Data requirements for semiconductor die
Part 5-3: Particular requirements and recommendations for die types - Minimally-packaged die

This European Specification was approved by CENELEC on 2001-08-21.

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

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Foreword

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

It was submitted to the National Committees for comments and was agreed at the CENELEC BTTF 97-1 meeting on 2001-08-21.

The following date was fixed:

- latest date by which the existence of the ES has to be announced at national level (doa) 2002-02-01

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
  - Part 6-2 Data dictionary

Introduction

This European Specification has been developed to facilitate the selection of unpackaged and minimally packaged semiconductor die, with or without connection structures in order to save both design and procurement time.

It is a data specification which defines the requirements of

- product identity,
- product data,
- die mechanical information,
- test, quality and reliability information,
- handling, storage and mounting information,
- thermal data and electrical simulation data.

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 projects, EECA, Sematech, DPC and EIAJ.

This 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 the GOOD-DIE project the need was identified for a standard way of presenting information for the selection and procurement of these components.

1 Scope

This European Specification 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 for handling bare die, with or without connection structures and minimally-packaged die.

ES 59008-5-3 specifies particular requirements and recommendations for minimally-packaged die (MPD) that are not contained elsewhere in this series of specifications.

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

ES 59008-5-3 is to be read in conjunction with ES 59008-1, General requirements, with and ES 59008-3, Mechanical, material and connectivity requirements, and, where relevant, with ES 59008-4-1, ES 59008-4-2, ES 59008-4-3 and ES 59008-4-4.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of ES 59008-5-3.

ES 59008	Data requirements for semiconductor die
ES 59008-1	Part 1: General requirements
ES 59008-2	Part 2: Vocabulary
ES 59008-3	Part 3: Mechanical, material and connectivity requirements
ES 59008-4-1	Part 4-1: Specific requirements and recommendations - Test and quality
ES 59008-4-2	Part 4-2: Specific requirements and recommendations - Handling and storage
ES 59008-4-3	Part 4-3: Specific requirements and recommendations - Thermal
ES 59008-4-4	Part 4-4: Specific requirements and recommendations - Electrical simulation
IPC/JEDEC J-STD-033	Standard for Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices"

3 Definitions

For the purposes of this European Specification, the definitions given in ES 59008-2, Vocabulary, and the following shall apply.

3.1
interposer
a material placed between two surfaces, giving electrical insulation, mechanical strength, and/or controlled mechanical separation. It may be used as a mechanism for redistributing electrical connections and/or allowing for differing thermal expansions between adjacent surfaces

4 Conformity levels

Conformity levels do not apply to this part of ES 59008 except where any item in this part of the standard is already covered by ES 59008-3, ES 59008-4-1, ES 59008-4-2, ES 59008-4-3 or ES 59008-4-4. This part provides recommendations for good industry practice when exchanging information about minimally-packaged die (MPD). All information specific to MPD is included in this part and may be used as a basis for a detailed supplier or user specification.

5 Specific recommendations – Design, selection, test and quality

This clause covers classes of information specifically related to the testing performed on the MPD by the supplier or related to the quality of the device supplied.

It should be assumed that the specification for the MPD will be treated as that usually given for a packaged product, and that standard test and quality routines, as for packaged product, will apply. As such, only details specific to MPD are covered here.

5.1 Encapsulation material

Information should be given on the nature of the material used for encapsulating the MPD and details of the encapsulation coverage and/or areas of coverage if the die is not fully or uniformly encapsulated.

5.2 Distortion or dimensional tolerance of connections

Information should be given about dimensional tolerance and co-planarity of the connection structures that may affect mounting of the MPD.

6 Specific recommendations - User or assembler related issues, techniques, best practice and material selection

This clause covers classes of information specifically of use to the user or assembler of MPDs including recommended assembly techniques, best practice for assembly and information on material selection for assembly.

6.1 Peak temperature and duration

Information should be given on the maximum recommended allowable peak assembly process temperature and time e.g. certain FLASH technologies may lose data when subjected to excessive temperature, and the glass transition temperature of any interposer material must not be exceeded during assembly.

6.2 Solder types and fluxing requirements

Information should be given on suggested solder types used to mount the MPD, especially any specific recommendations to enable lead-free soldering. Suggestions on flux material, on techniques for mounting using solder and for flux removal should also be given for MPDs.

6.3 Adhesive, underfill and attach limitations

Information should be given on adhesives and underfill that should either be used or avoided when mounting the MPD. Suggested limits on attach pressures, temperature and duration should also be given.