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D E C I S I O N
of 27 May 2002

Case Number: T 0708/99 - 3.4.3

Application Number: 96101286.1

Publication Number: 0724289

IPC: H01L 21/56

Language of the proceedings: EN

Title of invention:
Semiconductor unit package, semiconductor unit packaging method, and encapsulant for use in semiconductor unit packaging

Applicant:
MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 83, 84

Keyword:
"Clarity of claim (yes) - meaning of a technical term per se in a claim - clear to a skilled person"
"Support in the description (yes)"
"Sufficiency of description (yes)"

Decisions cited:
-

Catchword:

-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0708/99 - 3.4.3

D E C I S I O N
of the Technical Board of Appeal 3.4.3
of 27 May 2002

Appellant: MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD
1006, Ohaza Kadoma
Kadoma-shi
Osaka 571-8501 (JP)

Representative: Grünecker, Kinkeldey
Stockmair & Schwanhäusser
Anwaltssozietät
Maximilianstrasse 58
D-80538 München (DE)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 14 December 1998 refusing European patent application No. 96 101 286.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: R. K. Shukla
Members: E. Wolff
J. Van Moer

Summary of Facts and Submissions

I. In a decision dated 14 December 1998, the examining division refused European patent application No. 96 101 286.1 on the grounds that the application did not meet the requirements of Articles 84 and 83 EPC.

According to the decision, the term "latent curing accelerator" used in claim 1 was not clear and was not supported by the description. Moreover, the description did not contain any specific examples of latent curing accelerators so that the application did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by the person skilled in the art.

II. The notice of appeal against the above decision was filed on 19 February 1999 and the appeal fee was paid on the same day. The statement setting out the grounds of appeal was filed on 23 April 1999.

The appellant requests that the decision of the examining division be set aside and the patent be granted on the basis of the following documents:

Claims:
claims 1 to 10 as filed on 22 July 1998

Description:
pages 1 to 33 and 35 to 48 as originally filed
page 34 as filed on 27 January 1997

Drawings:

Sheets 1/7 to 7/7 as originally filed.

III. Claim 1 reads as follows:

"1. An encapsulant for filling a gap between a semiconductor device and a substrate of a semiconductor unit, said encapsulant comprising:

(a) 80% to 25% by weight of a resin binder containing at least a polyepoxide, an anhydride of a carboxylic acid, a rheology modifier, and a latent curing accelerator; and

(b) 20% to 75% by weight of a filler of a dielectric material, said filler having polar groups at its surface."

IV. The following document cited by the applicant was referred in the decision under appeal:

D3 EPOXY RESIN HANDBOOK, Published by Nikkan Kougyou Simbunsha on December 25, 1987

V. Together with the statement setting out the grounds of appeal the appellant filed the following documents in support of the appeal:

E1: Adhesive, Volume 37, No. 2, 1993: Original and English translation of page (69) 21, left column, to page (71) 23, right column, line 10.

E2 Latest Technologies for Polymer Additive, published by CMC: Original and English translation of page 148, lines 1 to 15, page 153, page 155, Table 6.4 to page 160, line 1 from the bottom.

E3 Adhesive, Volume 36, No. 8, 1992: Original and English translation of page (360) 24, left column, line 1 to page (361) 25, right column, line 10 from the bottom; page (336) 30, left column, lines 14 to 9 from the bottom; page (368) 32, left column, Table 7 to right column, Figure 14; page (369) 33, left column.

E4 Product information Fujihard

E5 Air Products and Chemical, Inc.: Product catalogue.

VI. The arguments presented by the appellant can be summarised as follows.

As shown by the submitted documents, the term "latent curing accelerator" has a clear and well known meaning in the art of curable polymer compositions. The cited documents further show that the products Amicure (trade mark), Fujihard (trade mark) and imidazole compounds, which are referred to in the present application, were well known latent curing accelerators. The person skilled in the art would therefore have no problem in selecting appropriate compounds that function as latent curing accelerators. Since the description defines the term latent curing accelerators and specifies examples, the application fulfills the requirements of Articles 84 and 83 EPC.

VII. In a communication dated 10 May 2001, the Board invited the appellant to establish to the satisfaction of the Board that documents E1 and E4 and any other information the appellant wished to rely on, had been published at the priority date of the application in

suit.

In response the appellant filed the following further documents to establish that documents E1 and E4 had been so published:

Document E1-1 photocopy of the front page and the subsequent two pages of the Japanese journal "Adhesive", vol 37 Nr. 2 1993, which is the source of document E1

Document E4-1 Technical Data sheet No. TB-90-2 concerning product information on FXE-1000

Document E4-2 copy of the front page and pages 2 to 3, 24 to 35 and 48 of the Japanese journal "Adhesive", Volume 36, No. 8, 1992, the original Japanese text and translations into English of selected passages on pages 24 and 25.

Reasons for the Decision

1. The appeal is admissible.

2. The application was refused by the examining division on the grounds that the expression "latent curing accelerator" as used in the description and claims was not a recognised term in the art so that the claims lacked clarity (Article 84 EPC). Also, since the description contained no specific examples of chemical compounds which could serve as latent curing accelerators, claim 1 was not supported by the

description (Article 84 EPC) and the application did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by the person skilled in the art (Article 83 EPC).

3. Thus, the objections under Article 84 and under Article 83 both arise from the term "latent curing accelerator" as used in the claims and the description.

4. *Article 84.*

4.1 Clarity

4.1.1 The requirement of Article 84 EPC that claims shall be clear is met if the subject-matter for which protection is sought is clear for a person skilled in the art to which the claimed subject-matter relates. In case of the use of a technical term in a claim it suffices for the purpose of clarity if the term per se is clear to the skilled person. Whether the term is well recognised in the art is then not relevant to the issue of clarity.

4.1.2 In the present case, claim 1 concerns an encapsulant belonging to the general field of curable resins. Such epoxy resins are known to contain curing agents which can be latent in the sense that they initiate or enhance the curing reaction only on application of some external energy, usually in the form of heat. Thus, the term "latent curing accelerator" in the context of the claimed subject matter would be understood by the skilled person to mean a curing agent which speeds up the curing reaction on application of external energy. This meaning is also consistent with the definition of the expression "latent curing accelerator" in the

description on page 34, lines 10 to 12 of the application. The Board therefore concludes that the term "latent curing accelerator" in claim 1 is clear.

4.2. Support in the description

4.2.1 There are general statements in the description discussing in general terms the use of latent curing accelerators. According to the paragraph bridging pages 9 and 10 of the application as filed, a latent curing accelerator is part of a preferred composition. On page 34, lines 10 to 14, of the description there is a definition of latent curing accelerators in the following terms: "A latent curing accelerator is a catalyst whose catalyst activities are greatly promoted on application of, for example, thermal energy. Generally latent curing accelerators are melted (liquefied) or reaction-dissociated upon application of energy, to be enhanced in activity."

4.2.2 There are also specific examples of compounds, Amicure (trademark) and Fujihard (trademark), which are employed in compositions 'c' and 'd' in Table 1, respectively (pages 38 and 39). As the discussion below on sufficiency of disclosure shows, these compounds were known at the priority date of the application to be latent curing accelerators. Thus, the application discloses specific compounds which function as latent curing accelerators.

4.2.3 The general statements together with the specific examples provide an adequate basis for the reference in claim 1 to latent curing accelerators. The Board therefore concludes that claim 1 in so far as it specifies a latent curing accelerator is supported by

the description as required by Article 84 EPC.

5. *Article 83*

5.1 According to Article 83 EPC, the disclosure of an invention must be clear enough and complete enough to enable a skilled person to carry out the invention. In the present case the question to be answered is whether the description and claims fail to fulfil these requirements because of the term "latent curing accelerators".

5.2 As discussed in section 5.2 above, the application in suit contains general statements about latent curing accelerators and provides the specific examples of Amicure (trademark) and Fujihard (trade mark) as chemical compounds which perform the function of latent curing accelerators for certain epoxy resins. For the purpose of determining whether the skilled person would have been able to perform the invention on the basis of the disclosure in the application, it must be ascertained whether those compounds were known by and would have been available to the skilled person at the priority date of the application.

5.3 The appellant has provided document D3, considered by the examining division, and documents E1 and E4, among others, to show that latent curing accelerators were known by and available to the skilled person. Documents E1-1 as well as documents E4-1 and E4-2 were provided to establish that documents E1 and E4, respectively, were published before the priority date of the application in suit.

(i) Document E1 (English translation) relates to

commercially available epoxy resins and refers in particular to what is called the AMICURE series (curing agent/accelerator) **placed on the market** by Ajinomoto Co. Inc. (page 2, second paragraph). Latency is discussed primarily in connection with the use of these products as curing agents. However, document E1 also informs the reader of the use of AMICURE products as curing accelerators (Tables 4 and 5, accompanying text on pages 7 and 8) and of extended storage times when AMICURE is used for that purpose. The ability to store these products is compared in Tables 4 and 5 with conventional accelerators, showing that AMICURE products result in a significantly longer storage life (40 days as against 1 day (Table 4), and >30 days as against 2 days (Table 5)). In addition, although no examples are given of the chemical composition or structure of these products, the tables make clear in the title that Amicure forms a curing accelerators for acid anhydride (table 4), dicyandiamide "DICY" (Table 5) and Diaminodiphenylsulfone "DDS" (Table 6).

The document also includes a section discussing latency in general (section 1, page 2, last four lines, to page 3, line 2).

(ii) Document E4 (English translation) describes that the curing agent "FUJIHARD" has been added to the existing group of products, thereby indicating that the product was available on the market at the time. Page 4 refers to the package appearance of the product, which provides further confirmation of the commercial availability of the

product. Although the product is described primarily as latent curing agent, the document also mentions its use as a curing accelerator when dicyandiamide or an acid curing agent is used (English translation, page 3, fourth paragraph). Additionally, on page 4 under the heading "Applicability" it is stated that the product can be used as a curing accelerator for other latent curing agent systems.

5.4 The Board accepts that documents E1-1, E4-1 and E4-2 suffice to show that at the priority date of application in suit the information contained in documents E1 and E4 was publicly available and, hence, that the products AMICURE (document E1) and Fujihard (document E4) to which they relate were known and available as latent curing accelerators in respect of certain epoxy resins such as dicyandiamide, organic acid hydrazide and, as claimed in claim 1 of the request, acid anhydride.

5.5 As to the difference between curing accelerators and curing agents, it is clear from the plain meaning of the words "agent" and "accelerator" that the presence of a curing agent will cause curing to take place, while the presence of a curing accelerator will merely increase the speed of curing. This distinction was accepted by the examining division (decision of 14 December 1998, page 3, last paragraph "the meaning of the term latent curing accelerator is not contested ...") and is confirmed by the contents of documents E1 and E4.

5.6 For the foregoing reasons the Board considers that, in respect of compositions 'c' and 'd' of table 1, the

invention is disclosed in a manner sufficiently clear and complete for it to be carried out by a skilled person.

6. For the reasons given, the Board concludes that the term "latent curing accelerator" in claim 1 is clear and the claimed subject-matter specifying the use of a latent curing accelerator is supported by the description. Moreover, the application as a whole complies with the requirements of Article 83 EPC.

7. It appears from the file that the application has not as yet been examined for compliance with other requirements of the EPC including those of Articles 52(1), 54, 56 and 123(2). Also, the extent to which the description needs to be adapted will need to be decided once the final wording of the claims has been established.

Order

For these reasons it is decided that:

1. The decision under appeal it is set aside.

2. The case is remitted to the department of first instance for further prosecution.

The Registrar: The Chairman:

D. Spigarelli R. K. Shukla