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D E C I S I O N
of 13 March 2001

Case Number: T 0263/98 - 3.4.3

Application Number: 89308034.1

Publication Number: 0390996

IPC: H01L 21/56

Language of the proceedings: EN

Title of invention:

IC card module

Applicant:

MITSUBISHI DENKI KABUSHIKI KAISHA

Opponent:

-

Headword:

IC card module/MITSUBISHI

Relevant legal provisions:

EPC Art. 54, 56

Guidelines C-III, 4.2

Keyword:

"Novelty (yes) - Interpretation of wording of claim"

Decisions cited:

-

Catchword:

-



Case Number: T 0263/98 - 3.4.3

D E C I S I O N
of the Technical Board of Appeal 3.4.3
of 13 March 2001

Appellant: MITSUBISHI DENKI KABUSHIKI KAISHA
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 23 October 1997
refusing European patent application
No. 89 308 034.1 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: R. K. Shukla
Members: G. L. Eliasson
A. C. G. Lindqvist

Summary of Facts and Submissions

I. European patent application No. 89 308 034.1 was refused in a decision of the examining division dated 23 October 1997. The ground for the refusal was that the subject matter of claim 1 filed with the letter dated 18 March 1996 was not new having regard to the prior art document

D1: EP-A-0 277 854.

II. The reasoning in the decision for the finding of lack of novelty can be summarized as follows:

- (a) Claim 1 specifies a first and a second moulding resin which however may be made of the same material. In this case, it is not possible to distinguish in the finished IC card module whether two moulding resins were used or only a single moulding resin. Therefore, the subject matter of claim 1 becomes identical to that known from document D1 (cf. D1, Figures 2 and 5).
- (b) Although not forming part of the reasons for the refusal, the examining division also held that the application as filed did not appear to contain a general disclosure supporting a claim which would define the first and second moulding resins to be different and distinguishable from each other. The disclosure of the application as filed only supports a claim which specifies the first and second resins to be an epoxy resin and a thermoplastic resin, respectively. Although the examining division informed the applicant that such a claim would be patentable, the applicant

was not able to accept such a restricted claim.

III. The appellant (applicant) lodged an appeal on 22 December 1997, paying the appeal fee on 23 December 1997. A statement of the grounds of appeal was filed on 23 February 1998 together with claims 1 to 18 forming an auxiliary request.

IV. The appellant requests that the decision under appeal be set aside and a patent be granted on the basis of one of the following requests:

Main request:

Claims: 1 to 20 filed with the letter dated 7 March 1995, where claim 4 is amended as requested in the statement of the grounds of appeal to read "dish-like" instead of "plate-like".

Description: pages 1 to 3, 5, 8, and 9, as originally filed;
pages 4, 6, 7 filed with the letter dated 18 March 1996

Drawings: sheets 1/2 and 2/2 as originally filed

Auxiliary request:

Claims: 1 to 18 filed with the statement of the grounds of appeal

Description: pages 1 to 3, 5, 8, and 9, as originally

filed;
pages 4, 6, 7 filed with the statement
of the grounds of appeal

Drawings: sheets 1/2 and 2/2 as originally filed

In addition, oral proceedings are requested in case the Board was to refuse the application.

V. The independent claims 1 and 13 in accordance with the main request read as follows:

"1. An article constituting an IC card module adapted to be mounted on a thin semiconductor device such as an IC card, and comprising:

a module substrate (12) one side of which is provided with a connection terminal (7);

a semiconductor IC (11) held on the other side of said substrate and provided with a projecting electrical connection pin (14) electrically connected to said connection terminal; and

a moulding resin (17) covering at least part of the electrically-connected portion (14, 16) between said connection terminal and said semiconductor IC and integrally molding said substrate and said semiconductor IC,

characterised in that the semiconductor IC is a resin-sealed IC unit (11) sealed with a first moulding resin, with said pin (14) projecting from its resin seal, and is embedded in a second moulding resin (17) which covers the electrical connection (14, 16) including said pin (14) and integrally moulds said substrate and said resin-sealed IC unit."

"13. A method of making an IC card module, comprising:
 providing a substrate (12), having a connection terminal (7) on one side;
 providing a semiconductor IC (11), having electrical connections;
 attaching the IC to the other side of said substrate electrically connecting it to said connection terminal; and
 applying a molding resin (17) to cover at least part of the electrical connection(14, 16) between said connection terminal and said semiconductor IC and integrally molding said substrate and said semiconductor IC is (sic):
 characterised in that the semiconductor IC is resin-sealed before it is applied to the substrate (12) and has projecting connection pins (14), and the molding resin (17) is applied to the resin-sealed IC to embed it on the substrate and cover its electrical connections including said pins."

VI. The appellant presented essentially the following arguments in support of his requests:

Claim 1 according to the main request defines a first moulding resin and a second moulding resin so that two bodies of resin must be present. Thus, if the first and second bodies of resin of claim 1 were formed from the same material and merge to become a single body of resin, as argued by the examining division in the decision under appeal, such a module would fall outside the scope of claim 1, since two bodies of resin are defined in claim 1. Moreover, throughout the specification two bodies of resin are disclosed and discussed and the skilled reader would not consider the claim to cover anything else.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and rule 64 EPC and is therefore admissible.
2. *Novelty - Main request*
 - 2.1 Document D1, which is the only document cited in the decision under appeal, discloses an IC card module comprising a module substrate 76 which on one side has a connection terminal 28 (cf. Figure 2; column 3, line 46 to column 4, line 58). A semiconductor IC 42 is held on the other side of the substrate and is provided with a projecting electrical connection pin 48 electrically connected to the connection terminal 28. A moulding resin 50 covers the pin 48 and integrally moulds the substrate and the semiconductor IC.
 - 2.2 In addition to the above-mentioned features undisputably known from document D1, the device of claim 1 according to the main request further specifies that the semiconductor IC is a resin-sealed IC which is sealed with a first moulding resin where the pin is projecting out from the first resin. The resin-sealed IC including the pin and the substrate are integrally molded in a second resin. In the device of document D1, on the other hand, a semiconductor IC 42 is directly mounted on the substrate 76 and the semiconductor IC is integrally moulded with the substrate in a single moulding resin 50.
 - 2.2.1 The examining division had in the decision under appeal argued that when the first and second resins are made of the same material, the two bodies of resin would in

finished IC module merge to a single body of resin, and thus, the device of claim 1 would not be distinguished from that of document D1 having a single body of resin.

- 2.2.2 By referring to the "finished IC module" in the above argumentation, it appears that the examining division did not consider the features "first moulding resin" and "second moulding resin" to be device features defining the structure of the device, but rather to be process features of sorts which merely define that the claimed device was produced using two steps of resin moulding.
- 2.2.3 As to the interpretation of claims, it is established practice in the EPO that the words of the claims should be given the meaning and scope which they normally have in the relevant art, and that the claims should be read with an attempt to make technical sense of the claim (cf. Guidelines for Examination in the European Patent Office, C-III, 4.2). Applying these principles to the present case, it is noted not only that the term "moulding resin" in the art normally describes a body of resin, but also that it makes technical sense to consider the first and second "moulding resins" as bodies of resin when reading claim 1 which defines a device and not a method. Therefore, the Board does not see any reason to deviate from the custom of considering the term "moulding resin" as a device feature. Since claim 1 defines a device having a first body and a second body of resin, this, however, presupposes that the two bodies of resin are distinguishable from each other, as also argued by the appellant. It follows from the description of the invention that even when both the moulding resins are made of the same material, a detectable distinction has

to be present, for example in the form of an interface between the two moulding resins. This means that for the device postulated by the examining division which would be produced by molding a resin in two steps in such manner that it is not possible to see from the finished device whether the moulding was carried out in one or in two steps, such a device would fall outside the scope of claim 1, since it does not show two distinguishable bodies of resin.

- 2.3 From the above discussion, it follows that the subject matter of claim 1 according to the main is new having regard to document D1 (Article 54 EPC).
- 2.4 The subject matter of claim 13 according to the main request is new as well (Article 54 EPC), since the method of claim 13 specifies that semiconductor IC is resin sealed before it is applied to the substrate, in contrast to the device of document D1 where an unsealed semiconductor IC is applied directly to the substrate.
3. Although the only ground given in the decision under appeal was lack of novelty, the examining division also considered inventive step for the case when the novelty objection would be overcome, and indicated that a device claim appropriately amended to overcome the novelty objection raised would meet the requirements of inventive step (cf. the decision under appeal, point 6(iii), as well as point 4 of the minutes of the oral proceedings held on 1 October 1997). Present claim 1 has not been amended as suggested by the examining division.

In the following, the Board in the exercise of its power under Article 111(1) EPC, has examined claim 1

for inventive step.

4. *Inventive step - Main request*

- 4.1 The technical problem, as stated in the application as filed, relates to the observation that one of the disadvantages of the prior art devices is that the IC card modules need to be manufactured in clean rooms which lowers the manufacturing yield, since the semiconductor ICs are not sealed. Furthermore, the use of a single moulding resin for sealing the semiconductor IC, as well as integrally sealing the connection portions of the semiconductor IC to the substrate, lowers the reliability of the device (cf. the application in suit, page 2, line 3 to page 3, line 2).

Also, having regard to the features distinguishing the claimed invention from the closest prior art document D1 as set out in item 2.2 above, the objective technical problem addressed by the present invention is the one set out in the application as filed, i.e. to improve the manufacturing yield and the reliability of an IC card module.

- 4.2 As the available prior art documents do not contain any suggestion to mould a resin-sealed IC in a second moulding resin, the Board concludes that the subject matter of claim 1 according to the main request involves an inventive step within the meaning of Article 56 EPC.

Likewise, the subject matter of independent claim 13 according to the main request involves an inventive step.

Therefore, in the Board's judgement, independent claims 1 and 13 according to the main request meet the requirements of Article 52(1) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of the first instance with the order to grant a patent on the basis of the documents according to the main request as specified under item IV above.

The Registrar:

The Chairman:

L. Martinuzzi

R. K. Shukla