

Veröffentlichung im Amtsblatt	J/Nein
Publication in the Official Journal	Yes/No
Publication au Journal Officiel	Oui/Non



Aktenzeichen / Case Number / N^o du recours : T 18/87 - 3.5.1

Anmeldenummer / Filing No / N^o de la demande : 55 451

Veröffentlichungs-Nr. / Publication No / N^o de la publication : 81 110 659.0

Bezeichnung der Erfindung: Semiconductor memory device

Title of invention:

Titre de l'invention :

Klassifikation / Classification / Classement :

ENTSCHEIDUNG / DECISION

vom / of / du 17 April 1989

Anmelder / Applicant / Demandeur :
(1) Hitachi Ltd.
(2) Hitachi Maxell Ltd.

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56

Kennwort / Keyword / Mot clé : Inventive step (yes)

Leitsatz / Headnote / Sommaire

Europäisches
Patentamt

European Patent
Office

Office européen
des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number : T 18/87 - 3.5.1



DECISION
of the Technical Board of Appeal 3.5.1
of 17 April 1989

Appellant : (1) Hitachi Ltd.,
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(2) Hitachi Maxell Ltd.,
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Decision under appeal : Decision of Examining Division 067 of the European
Patent Office dated 28 July 1986 refusing
European patent application No. 81 110 659.0
pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : P.K.J. van den Berg
Members : W.J.L. Wheeler
E. Persson

Summary of Facts and Submissions

- I. European patent application No. 81 110 659.0 (publication No. 55 451), filed on 21 December 1981 and claiming priority from a previous application JP 188723/80 of 26 December 1980, was refused by a decision of the Examining Division 067 of the European Patent Office dated 28 July 1986. That decision was based on Claims 1 to 8 filed with a letter dated 25 February 1986.

- II. The reason given for the refusal was that the subject-matter of the claims did not involve an inventive step within the meaning of Article 56 EPC having regard to the following prior art documents:

D1: Patent Abstracts of Japan, Vol. 4, No. 168 (P-37) (650) and JP-A-55 113 189

D2: DE-A-28 29 052

D3: Electronics Reliability & Microminiaturization, Vol. 1, pages 97 to 98.

- III. On 7 October 1986 the Appellant filed a notice of appeal against that decision. The fee for appeal was paid on the same day. The statement of grounds was filed on 8 December 1986, accompanied by a new set of Claims 1 to 3.

- IV. In reply to communications from the Board, the Appellant filed with a letter dated 10 June 1988 amended pages of description and requested the cancellation of certain passages of the description and of Figures 6 and 7 of the drawings. In a letter dated 28 March 1989 the Appellant requested cancellation of Claim 3 and correction of an error on page 3 of the description.

V. The Appellant requests that the decision under appeal be set aside and a patent granted on the basis of the following documents:

Claims 1 and 2 filed on 8 December 1986;

Description: pages 2, 3 and 9 filed on 10 June 1988, with amendment of the word "means" on page 3, line 18, to read "meets";

pages 1, 4 to 8 and 10 to 12 as originally filed, with cancellation of the passages at page 4, lines 12 to 16, and page 10, line 7 to page 11, line 20;

Drawings, sheets 1/4 to 3/4 as originally filed.

VI. Claim 1 is worded as follows:

"1. A semiconductor device comprising an integrated circuit chip formed on a semiconductor substrate (1) and including a memory part (3...7) in which a plurality of volatile memory elements are arrayed, and at least one electric energy storing cell (9...11 & 31...35) connected to power supply terminals (6, 6') of said integrated circuit chip, characterized in

that said chip is covered by a passivation film (8),

that said cell (9...11; 31...35) is a fully solid-state thin film battery and is laminated on the surface of said passivation film (8), and

that said integrated circuit chip and battery are packaged as a unit."

Claim 2 is dependent on Claim 1.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.
2. All the features specified in the current Claims 1 and 2 are disclosed in the originally filed description, from page 4, line 23 to page 5, line 24 and from page 7, line 24 to page 8, line 15 with reference to Figures 1 and 3 of the drawings.

The only amendments made to the description and drawings are for the purposes of adapting the description to the current Claim 1, indicating the prior art, and removing inconsistencies.

Therefore the current version of the application does not contravene Article 123(2).

3. A device according to the prior art portion of Claim 1 is known from D1. In this known device the holding time of a volatile memory mounted on a circuit board is prolonged by means of a power supply incorporated in a detachable handle adapted to be attached to the circuit board.

The device according to Claim 1 differs from the device known from D1 in that the energy storing cell is a fully solid state thin film battery laminated on the surface of a passivation film covering the chip, the chip and battery being packaged as a unit.

In the opinion of the Board, none of the devices known from the other cited documents is closer to the device claimed in Claim 1 of the present application. This device is, therefore, new.

4. The present invention solves the problem of providing a compact and easily manufactured means of avoiding loss of information stored in a volatile memory when the power supply is interrupted.
5. Although it is known from D2 and D3 to provide electronic integrated circuits with their own integrated power supply in the form of a photovoltaic or thermal battery, neither of those documents suggests the particular structure now claimed. On the contrary, if the teaching of those documents were to be applied to a chip including a volatile memory, the resulting devices would differ from the device according to Claim 1 of the present application in that
 - (a) the integrated battery would not be an energy storing cell and
 - (b) the battery would not be laminated on the surface of a passivation film covering the chip.
6. In the opinion of the Board, the cited documents would not lead a person skilled in the art all the way to the device according to Claim 1 of the present application. He would have to take at least two more steps on his own initiative, namely (a) decide to use a fully solid-state thin film energy storing cell instead of a photovoltaic or thermal battery and (b) decide to laminate the cell on the surface of the passivation film.
7. In summing up, the Board takes the view that the device claimed in Claim 1 of the present application is not obvious having regard to the cited prior art and therefore involves an inventive step within the meaning of Article 56 EPC.
8. Claim 2 is properly dependent on Claim 1. It follows that its subject-matter also involves an inventive step.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of the Appellant's request (paragraph V above).

The Registrar

J. Fabiani

S. Fabiani

The Chairman

P.K.J. van den Berg

P.K.J. van den Berg

27.07.89