

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIDEHARU MIYAKE

Appeal No. 96-2594
Application 08/312,395¹

ON BRIEF

Before KRASS, JERRY SMITH and HECKER, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1 through 6, all of the claims pending in the application.

¹ Application for patent filed September 26, 1994. According to appellant, this case is a continuation of Application 08/051,343 filed April 23, 1993, now abandoned.

The invention pertains to semiconductor devices. More particularly, a semiconductor memory is provided with stacked capacitor cells and having a structure such that the surface level of the device has little variation, thus improving miniaturization and integration of the device.

Independent claim 1 is reproduced as follows:

1. A stacked capacitor cell structure for a semiconductor memory device comprising:

a semiconductor substrate;

a field oxide film being selectively formed in a surface region of said semiconductor substrate so as to define an active region in said surface region of said semiconductor substrate;

a transistor having a diffusion region formed in said active region;

a first interlayer insulator overlying both said transistor and said field oxide film, said first interlayer insulator having a contact hole with a diameter, said contact hole exposing a part of said diffusion region of said transistor;

a second interlayer insulator overlying said first interlayer insulator, said second interlayer insulator both having a through hole with a larger diameter than said diameter of said contact hole and having a greater thickness than said first interlayer insulator and said field oxide film, said through hole thereby exposing a part of said first interlayer insulator around said contact hole;

a stacked capacitor formed within said through hole formed in said second interlayer insulator, said stacked capacitor comprising a storage electrode formed in contact with said part of said diffusion region of said transistor via said through hole and said contact hole in which a capacitive insulation film overlying said storage electrode and an opposite electrode overlying said capacitive insulation film; and

a third interlayer insulator overlying both said stacked capacitor and said second interlayer insulator.

Appeal No. 96-2594
Application 08/312,395

The examiner relies on the following reference:

Moriuchi
(Japanese Application)²

2-50476

Feb. 20, 1990

Claims 1 through 6 stand rejected under 35 U.S.C. § 103 as unpatentable over Moriuchi.

Reference is made to the briefs and answer for the respective positions of appellant and the examiner.

OPINION

We have reviewed the evidence before us, including, inter alia, the arguments of appellant and the examiner in the briefs and answer, respectively, and we conclude from such a review that the examiner has not established a prima facie case of obviousness with regard to the instant claimed subject matter.

² In addition to the English translation of this reference supplied by appellant, we rely on an English translation thereof prepared by the United States Patent and Trademark Office, a copy of which is attached hereto.

Accordingly, we will not sustain the rejection of claims 1 through 6 under 35 U.S.C.

§ 103.

Independent claim 1 calls for, inter alia, a contact hole exposing a part of the diffusion region and a through hole, having a larger diameter than the contact hole, exposing a part of the first interlayer insulator “around said contact hole.” Therefore, although the claim is open-ended, by reciting “comprising” in the preamble, it is not sufficient for the through hole 19c and the contact hole, shown to the right of the through hole in Moriuchi’s Figure 23, for example, to be spaced apart. Although the examiner might argue that both the through hole and contact hole in Moriuchi expose a part of the first interlayer insulator³ and that through hole 19c has a larger diameter than the contact hole, the claim still calls for the through hole to expose a part of the first interlayer insulator at a particular location, that location being “around said contact hole.” It is clear to us, from an inspection of Moriuchi (Figure 23, for example) that Moriuchi’s through hole does not expose a part of the first interlayer insulator “around said contact hole,” as claimed.

³ It does not appear to us that the through hole 19c in Moriuchi’s Figure 23 goes through the entire insulating layer 8.

Further, the claim requires that the stacked capacitor be formed “within said through hole...” The stacked capacitor, comprising elements 13, 14 and 15 in Moriuchi, may be said to be formed in the contact hole but it is quite clear from Figure 23, for example, of Moriuchi that the stacked capacitor is not formed “within said through hole,” as claimed.

The examiner’s comment, at the top of page 4 of the answer, regarding the capacitor lying in the contact hole as “irrelevant, since nothing in the claim prohibits such a structure,” is not well founded. Independent claim 1 clearly calls for the capacitor to be “within said through hole...” The capacitor in Moriuchi, while arguably being in the contact hole, is clearly not in the through hole.

The examiner then attempts to explain this discrepancy away by concluding that “if the second insulator 19 did not have a through hole, the capacitor would not be allowed to fan out as is does” [answer-page 4]. In an alternative explanation, the examiner concludes that it would have been obvious “to use such a structure for the fan-out portion of the capacitor...” [answer-page 4]. We, like appellant, are at a loss as to what the examiner intends by a “fan-out” portion of a capacitor. This does not appear to be a technical term of art and the examiner has provided

Appeal No. 96-2594
Application 08/312,395

no evidence of the “fan-out” of a capacitor, as by way of a secondary reference, for example, to show why it would have been obvious to modify the structure of Moriuchi in some unexplained way in order to arrive at the instant claimed invention.

The examiner’s decision rejecting claims 1 through 6 under 35 U.S.C. § 103 is reversed.

REVERSED

ERROL A. KRASS)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
)	APPEALS AND
JERRY SMITH)	INTERFERENCES
Administrative Patent Judge)	
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STUART N. HECKER)	
Administrative Patent Judge)	

Appeal No. 96-2594
Application 08/312,395

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Appeal No. 96-2594
Application 08/312,395

ROBERT J. PATCH
YOUNG & THOMPSON
745 SOUTH 23RD STREET
ARLINGTON, VA 22202