

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte STEVEN C. AVANZINO, MINH VAN NGO, ANGELA T. HUI,
CHUN JIANG, and HAMID PARTOVI

Appeal No. 2001-1494
Application No. 09/375,500

ON BRIEF

Before THOMAS, HAIRSTON, and BLANKENSHIP, Administrative Patent Judges.
BLANKENSHIP, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 13-19.

We reverse.

BACKGROUND

The invention is directed to a semiconductor device using silicon carbide (SiC) for a local interconnect etch stop layer. According to appellants, SiC is a low dielectric constant material that reduces gate-to-local interconnect capacitance in comparison to materials used in the prior art, such as silicon nitride or silicon oxynitride. Claim 13 is reproduced below.

13. A semiconductor device comprising:
 - a substrate having a main surface;
 - a field dielectric region isolating an active region;
 - a transistor formed in the active region, the transistor comprising:
 - a first gate electrode on the main surface of the substrate with a gate dielectric layer therebetween; and
 - source/drain regions in the substrate with a channel region therebetween underlying the gate electrode;
 - a second gate electrode extending on the field dielectric region;
 - a conformal layer of silicon carbide (SiC) over the transistor, second gate electrode and field dielectric region;
 - an inter-dielectric layer on the SiC layer;
 - an opening formed in the inter-dielectric layer and SiC layer exposing a

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The examiner relies on the following references:

Doan et al. (Doan)	5,240,871	Aug. 31, 1993
Cederbaum et al. (Cederbaum)	5,381,046	Jan. 10, 1995

Claims 13-19 stand rejected under 35 U.S.C. § 103 as being unpatentable over Cederbaum and Doan.

Claims 1-12 have been withdrawn from consideration.

We refer to the Final Rejection (Paper No. 8) and the Examiner's Answer (Paper No. 13) for a statement of the examiner's position and to the Brief (Paper No. 12) and the Reply Brief (Paper No. 14) for appellants' position with respect to the claims which stand rejected.

OPINION

The examiner's rejection of independent claim 13, as set forth at pages 3 through 5 of the Answer, contends that Cederbaum discloses the basic structure of the claimed semiconductor device. However, Cederbaum discloses the "conformal layer" as being formed of "aluminum oxide." The rejection turns to Doan (col. 4, ll. 47-50 and Fig. 17) to show that "silicon carbide is a functional equivalent to aluminum oxide as used in Cederbaum." Based on the alleged evidence of "functional equivalence" or

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Appellants present reasons (Brief at 4-6) with respect to why they believe the processes disclosed by Cederbaum and Doan differ to such extent that the artisan would not have presumed interchangeability of the relevant materials. Appellants also refer to Cederbaum (id. at 6-7) as disclosing that the material in question must have “good etching selectivity” with the phosphosilicate glass (PSG) layer and, based on this disclosure, allege that the prior art applied does not show interchangeability of aluminum oxide and silicon carbide.

The examiner responds in turn (Answer at 6-7) that Doan forms an opening by etching through a silicon oxide layer, using an etch stop layer which can be either silicon carbide or aluminum oxide. “Therefore, Doan et al. clearly establishes that silicon carbide is a functional equivalent to aluminum oxide used in Cederbaum et al. as an etch stop layer for etching a silicon oxide layer.” (Id. at 6.)

We find that Doan does suggest (col. 4, ll. 45-50) that the artisan would have considered aluminum oxide and silicon carbide as interchangeable materials for use as an etch stop layer, at least in the environment disclosed by Doan. Cederbaum, in the paragraph bridging columns 6 and 7 of the disclosure, teaches that the etch stop layer to be used in that device is preferably intrinsic polysilicon, although Al_2O_3 is suitable.

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Cederbaum thus does not disclose or suggest that any material that was known to be useful for an etch stop layer would be suitable for the semiconductor device taught. The reference sets forth specific guidance with respect to the requirements of the material to be used. On this record, we cannot say with certainty that silicon carbide would not meet the requirements set forth by Cederbaum.

However, in view of the instant record, and further in view of the relevant allocation of burdens, appellants need not show that silicon carbide fails to meet the specifications for an etch stop layer taught by Cederbaum. The examiner bears the initial burden of presenting a prima facie case of unpatentability. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). The evidence provided by the references before us fails to establish that the artisan would have recognized silicon carbide as meeting the specific requirements for an etch stop layer set forth by Cederbaum.

We are thus persuaded by appellants that the section 103 rejection of claim 13 is in error. Since the remainder of the claims on appeal incorporate the limitations of claim 13, we do not sustain the rejection of claims 13-19 under 35 U.S.C. § 103 as being unpatentable over Cederbaum and Doan.

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CONCLUSION

The rejection of claims 13-19 under 35 U.S.C. § 103 is reversed.

REVERSED

JAMES D. THOMAS
Administrative Patent Judge

KENNETH W. HAIRSTON
Administrative Patent Judge

HOWARD B. BLANKENSHIP
Administrative Patent Judge

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