

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 12

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DONALD L. PLUMTON

Appeal No. 1996-1616
Application No. 08/158,673¹

ON BRIEF

Before BARRETT, TORCZON, and GROSS, Administrative Patent Judges.

GROSS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1 through 9. Claims 10 through 16 have been withdrawn from consideration.

The appellant's invention relates to an integrated circuit having the same layer of semiconductor material

¹ Application for patent filed November 29, 1993. According to appellant, this application is a continuation-in-part of Application No. 08/056,682, filed April 30, 1993, now abandoned.

Appeal No. 1996-1616
Application No. 08/158,673

forming both the drain of a vertical field effect transistor and also the cathode of a diode. Claim 1 is illustrative of the claimed invention, and it reads as follows:

1. An integrated circuit, comprising:
 - (a) a vertical field effect transistor with a drain in a first portion of a first layer of semiconductor material; and
 - (b) a diode with a cathode including a second portion of said first layer and spaced from said first portion.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Müller 1980	4,183,036	Jan. 08,
Yoshida et al. (Yoshida) 08, 1981	4,288,800	Sep.
Blanchard et al. (Blanchard) 23, 1990	4,896,196	Jan.
Korman et al. (Korman) 1992	5,111,253	May 05,
Lüth 16, 1992	5,122,853	Jun.

Claim 6 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Blanchard.

Claims 2 through 5, 7, and 8 stand rejected under 35 U.S.C. § 103 as being unpatentable over Blanchard in view of

Appeal No. 1996-1616
Application No. 08/158,673

Lüth, further in view of Müller (for claim 5), Korman (for claim 7), or Yoshida (for claim 8).

Claim 9 stands rejected under 35 U.S.C. § 103 as being unpatentable over Blanchard in view of Korman.

Reference is made to the Examiner's Answer (Paper No. 11, mailed October 25, 1995) for the examiner's complete reasoning in support of the rejections, and to the appellant's Brief (Paper No. 10, filed October 3, 1995) for the appellant's arguments thereagainst.

OPINION

As a preliminary matter, we note that appellant has indicated on page 3 of the Brief that claims 1, 2 through 4, 5, 6, 7, 8, and 9 are not to stand or fall together. However, for claims 2 through 4, 7, and 9 appellant has not presented reasons as set forth in 37 CFR § 1.192(c)(7)² as to why the

² For each ground of rejection which appellant contests and which applies to a group of two or more claims, the Board shall select a single claim from the group and shall decide the appeal as to the ground of rejection on the basis of that claim alone unless a statement is included that the claims of the group do not stand or fall together and, in the argument under paragraph (c)(8) of this section, appellant explains why the claims of the group are believed to be separately patentable. Merely pointing out differences in what the claims cover is not an argument as to why the claims are separately patentable." 37 CFR § 1.192(c)(7) (underlining added for

Appeal No. 1996-1616
Application No. 08/158,673

claims are separately patentable. In fact, appellant has pointed to the arguments for claim 1 for all of claims 2 through 4, 7, and 9. Accordingly, we will treat the claims as falling into 4 groups as follows: (1) claims 1 through 4, 7, and 9, (2) claim 5, (3) claim 6, and (4) claim 8, with claim 1 being representative of group 1.

We have carefully considered the claims, the applied prior art references, and the respective positions articulated by the appellant and the examiner. As a consequence of our review, we will reverse the indefiniteness rejection of claim 6, affirm the anticipation rejection of claim 1 and the obviousness rejections

of claims 2 through 4, 7, and 9, and reverse the obviousness rejection of claims 5 and 8.

With respect to the rejection of claim 6 under 35 U.S.C. § 112, second paragraph, the examiner contends (Final Rejection, page 1) that "it is not clear how the cathode can include a portion of the source layer." The examiner asserts

emphasis)

Appeal No. 1996-1616
Application No. 08/158,673

that the cathode cannot be part of the source layer because "figs. (14-16) of the application (and associated explanation) clearly shows that the cathode can only be a part of the drain, since the source layer is separated from the diode cathode by the gate, channels and the isolation structure." (Final Rejection, page 1.) The examiner apparently has limited "source layer" to only the "source." However, appellant discloses (Specification, page 17, second full paragraph) that "the Schottky diode has n- cathode 1454 of thickness equal to the sum of the thickness of drain layer 1408 plus the thickness of n- source layer 1402," where "source layer" clearly refers to the entire epitaxial layer which includes the source, the p⁺ region, and a portion of the cathode. Further, appellant (Specification, page 17, last paragraph) explains the fabrication of the diode as including "the n- GaAs channel/source epitaxial layer overgrowth, which forms the upper portion of cathode 1454 of Schottky diode 1450." In addition, Figure 14 clearly shows layer 1402 forming the VFET channels in between the gate fingers, the VFET source above the gate fingers, and the upper portion of the diode cathode adjacent

Appeal No. 1996-1616
Application No. 08/158,673

to the gate fingers. Accordingly, the cathode does include a portion of the source layer. Thus, we cannot sustain the rejection of claim 6.

The examiner rejects claim 1 as being anticipated by Blanchard. Claim 1 requires, in pertinent part, a vertical field effect transistor. Appellant argues that Blanchard includes a DMOS transistor and not a vertical field effect transistor, because the arrows in Figure 3d show current flow beginning in the horizontal direction. Blanchard defines the vertical DMOS transistor devices of Figure 1 (column 1, lines 14-18) as "field effect transistor (FET) cell structures in which a common substrate drain 10 serves multiple vertical DMOS cells" (underlining added for emphasis). The transistor in Figure 3d, upon which the examiner relies for the rejection of claim 1, has the same structure as that of Figure 1. In other words, Blanchard's transistor in Figure 3d has a "vertical" structure and is a "field effect transistor" with a substrate drain.

Although Blanchard's vertical cell differs from appellant's vertical field effect transistor, appellant has not clearly

Appeal No. 1996-1616
Application No. 08/158,673

defined the phrase in the specification. It is well established

that "claims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification in giving them their 'broadest reasonable interpretation.'" In re Marosi, 710 F.2d 799, 218 U.S.P.Q. 289 (Fed.Cir. 1983).

Accordingly, "[w]ords which were defined in the specification must be given the same meaning when used in a claim." McGill, Inc. v. John Zink Co., 736 F.2d 666, 674, 221 U.S.P.Q. 944, 949 (Fed. Cir. 1984), cert. denied, 105 S.Ct. 514 (1984).

Conversely, where words or phrases are not clearly defined in the specification, as in the present application, they must be given the broadest reasonable interpretation. Giving the phrase "vertical field effect transistor" its broadest reasonable interpretation, we find that Blanchard's field effect transistor which is described as being vertical satisfies the phrase. As appellant has presented no further arguments with respect to claim 1, we will sustain the rejection of claim 1. Further since claims 2 through 4, 7,

Appeal No. 1996-1616
Application No. 08/158,673

and 9 stand or fall with claim 1, we also will affirm the obviousness rejection of those claims.

As to claim 5, Blanchard's body region 63 could be viewed as isolating the transistor from the diode. Blanchard, however,

does not disclose a trench to separate the two elements. The examiner turns to Müller to substitute a trench structure for

Blanchard's isolation element. The examiner states (Final Rejection, page 4) that "the prior art teaches that a trench structure can be used to isolate elements which inturn [sic] decreases noise interference between integrated circuits on the same substrate." We find no teaching or suggestion in Müller, and the examiner fails to point to any particular portion, which would motivate one of ordinary skill in the art to use a trench in Blanchard's device. Merely that the prior art can be modified in the manner suggested by the examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-4 (Fed. Cir. 1992).

"There must be some reason, suggestion, or motivation found in

Appeal No. 1996-1616
Application No. 08/158,673

the prior art whereby a person of ordinary skill in the field of the invention would make the combination." In re Oetiker, 977 F.2d 1443, 1447, 24 USPQ2d 1443, 1446 (Fed. Cir. 1992). Accordingly, we cannot sustain the rejection of claim 5.

For claim 8, the examiner combines Yoshida with Blanchard and Luth. As pointed out by appellant (Brief, page 4) "Yoshida has no suggestion of diodes and thus [no] suggestion of the requirement [of] a common doping profile of claim 8." The examiner contends (Answer, page 5) that "the Yoshida reference was not used to show the doping profile, but was used to show the claimed gate structure." The examiner continues (Answer, page 6) that "[i]t is also clear from the Blanchard reference both regions 63d and 63 have a P⁺ concentration and not just one region having a P⁻ or a P⁺⁺ (which is a common notation to show different concentration levels of semiconductor regions) relative to the other region." However, since the device of Blanchard must be modified to incorporate the gate structure of Yoshida, the entire transistor structure gets changed. Thus, even if Blanchard has common doping profiles before the

Appeal No. 1996-1616
Application No. 08/158,673

modification, it is unclear to us how Blanchard can continue to disclose common doping profiles after the modification if the whole transistor is different. Accordingly, we will not sustain the rejection of claim 8.

CONCLUSION

In summary, the decision of the examiner rejecting claim 6 under 35 U.S.C. § 112, second paragraph is reversed. The decision of the examiner rejecting claim 1 under 35 U.S.C. § 102(b) and claims 2 through 4, 7, and 9 under 35 U.S.C. § 103 is affirmed. The decision of the examiner rejecting claims 5 and 8 under 35 U.S.C. § 103 is reversed.

The examiner's decision is affirmed-in-part.

Appeal No. 1996-1616
Application No. 08/158,673

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

LEE E. BARRETT)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
RICHARD TORCZON)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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ANITA PELLMAN GROSS)	
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Appeal No. 1996-1616
Application No. 08/158,673

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