

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. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JUNKO MORIKAWA, HIDEMASA TAKAHASHI
and KAZUNORI ASANO

Appeal No. 1999-0892
Application No. 08/630,128

ON BRIEF

Before RUGGIERO, DIXON, and GROSS, Administrative Patent Judges.
RUGGIERO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal from the final rejection of claims 1-9, which are the only claims remaining in the application. Claims 10-13 have been canceled.

The claimed invention relates to a field effect transistor (FET) having a step-doped and recessed gate structure with the gate electrode oriented along a specific direction. This

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specific orientation, designated as [011], permits drain current to run along the crystal orientation designated as [01(-1)].

Appellants assert at page 6 of the specification that this particular gate orientation provides improved linearity of transfer conductance and an improved strain characteristic.

Claim 1 is illustrative of the invention and reads as follows:

1. A field effect transistor comprising:

(a) a semi-insulating GaAs substrate;

(b) a step-doped structured active layer including an n type GaAs layer formed on said substrate, and an n-type GaAs layer or a non-doped GaAs layer formed on said n type GaAs layer, said n- type GaAs layer or non-doped GaAs layer being formed with at least one recess; and

(c) a gate electrode formed in said recess so that said gate electrode is oriented in such a direction that drain current runs in said active layer along crystal orientation [01(-1)].

The Examiner relies on the following prior art:

Onodera et al. (Onodera)	4,791,471	Dec. 13, 1988
Willer	4,889,827	Dec. 26, 1989

R. E. Williams (Williams), "Graded Channel FET's: Improved Linearity and Noise Figure", IEEE Transactions on Electron Devices, Vol. ED-25, No. 6, 600-05 (June 1978).

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Claims 1-9 stand finally rejected under 35 U.S.C. § 103 as being unpatentable over Onodera in view of Willer and Williams.

Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the Briefs¹ and Answer for the respective details.

OPINION

We have carefully considered the subject matter on appeal, the rejection advanced by the Examiner, the arguments in support of the rejection and the evidence of obviousness relied upon by the Examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, Appellants' arguments set forth in the Briefs along with the Examiner's rationale in support of the rejection and arguments in rebuttal set forth in the Examiner's Answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill

¹ The Appeal Brief was filed February 27, 1998 (Paper No. 13). In response to the Examiner's Answer dated March 18, 1998 (Paper No. 14), a Reply Brief was filed April 21, 1998 (Paper No. 15), which was acknowledged and entered by the Examiner in the communication dated July 21, 1998 (Paper No. 16).

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in the art the obviousness of the invention set forth in claims 1-9. Accordingly, we reverse.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the Examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert.denied, 475 U.S. 1017 (1986); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221

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USPQ 929, 933 (Fed. Cir. 1984). These showings by the Examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

With respect to independent claims 1, 5, and 9, the Examiner, as the basis for the obviousness rejection, proposes to modify the FET structure disclosure of Onodera. As recognized by the Examiner, Onodera, while describing an FET utilizing a semi-insulating GaAs substrate, lacks a disclosure of step doping and a recess formation of the gate electrode. To address these deficiencies, the Examiner turns to Williams and Willer for the teachings of step-doping and recess gate formation, respectively. According to the Examiner (Answer, pages 4 and 5), the skilled artisan would have been motivated and found it obvious to modify Onodera with Williams and Willer to achieve a uniform threshold voltage with a change in gate length, as well as to provide a self-aligned gate.

In response, Appellants, in asserting a lack of establishment by the Examiner of a prima facie case of obviousness, do not attack the combinability of the applied Onodera, Williams, and Willer references. Rather, Appellants

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contend (Brief, pages 4 and 5; Reply Brief, pages 1 and 2) that the skilled artisan would not choose a gate orientation for the resulting structure that would produce a drain current along crystal orientation [01-1] as claimed. Appellants point out that the Examiner has relied on a disclosure of a conventional FET at column 3, lines 3-17 of Onodera which describes a comparison relationship between gate threshold voltage and gate length for orientations [01(-1)] and [011] as illustrated in Figure 3. The Examiner has relied upon Onodera's Figure 3 illustration as teaching the advantages of using a gate orientation producing a drain current direction along orientation [01(-1)] as in the appealed claims, and suggesting the obviousness to the skilled artisan of selecting such an orientation.

Appellants contend, however, that the Examiner has disregarded the remainder of the disclosure of Onodera beginning with a discussion of the Figure 4 embodiment at column 3, line 18. In Appellants' view, the teaching provided to the skilled artisan by the bulk of the disclosure of Onodera is to select neither of the orientations offered for comparison in Figure 3,

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but rather to choose a further orientation [001] for improved results.

After careful review of the applied prior art references in light of the arguments of record, we are in agreement with Appellants' position as stated in the Briefs. While it is proper for an Examiner to consider, not only the specific teachings of a reference, but inferences a skilled artisan might draw from them, it is equally important that the teachings of prior art references be considered in their entirety. See In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968); W.L. Gore & Associates, Inc. V. Garlock, Inc., 721 F.2d 1540, 1548, 220 USPQ 303, 311 (Fed. Cir. 1983), cert denied, 469 U.S. 851 (1984).

In particular, in order for us to accept the Examiner's conclusions in the present factual situation, we would have to improperly selectively ignore significant portions of the disclosure of the Onodera reference. In our view, the skilled artisan, considering the entirety of the disclosure of Onodera, would be led away from selecting the particular gate orientation specified in Appellants' claims, i.e. an orientation producing a drain current in a direction along the [01(-1)] orientation. We

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reach this conclusion in view of the express disclosure of the Figure 4 embodiment in Onodera. As asserted by Appellants, while Onodera demonstrates the advantage of using a [01(-1)] as opposed to a [011] orientation, Onodera also notes the large deviations produced by either of these orientations. The remainder of the disclosure of Onodera is directed to the increased results produced by a further orientation, i.e. [001].

In conclusion, we are left to speculate why one of ordinary skill would have found it obvious to select the particular [01(-1)] gate orientation in Onodera to make the resultant combination suggested by the Examiner. The only reason we can discern is improper hindsight reconstruction of Appellants' claimed invention. In order for us to sustain the Examiner's rejection under 35 U.S.C. § 103, we would need to resort to speculation or unfounded assumptions or rationales to supply deficiencies in the factual basis of the rejection before us. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968), rehearing denied, 390 U.S. 1000 (1968). Since we are of the view that the prior art applied by the Examiner does not support the rejection, we do

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not sustain the obviousness rejection of independent claims 1, 5, and 9, nor of claims 2-4 and 6-8 dependent thereon.

In conclusion, we have not sustained the Examiner's rejection of any of the claims on appeal under 35 U.S.C. § 103. Accordingly, the decision of the Examiner rejecting claims 1-9 is reversed.

REVERSED

JOSEPH F. RUGGIERO)	
Administrative Patent Judge)	
)	
)	
)	
)	BOARD OF PATENT
JOSEPH L. DIXON)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
)	
)	
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ANITA PELLMAN GROSS)	
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Letty

JUDGE RUGGIERO

APPEAL NO. 1999-0892

APPLICATION NO. 08/630,128

APJ RUGGIERO

APJ GROSS

APJ DIXON

DECISION: **REVERSED**

PREPARED: Jun 13, 2002

OB/HD

PALM

ACTS 2

DISK (FOIA)

REPORT

BOOK