

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 31

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte YUKIO NISHIDA and SATOSHI SHIMIZU

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Appeal No. 2000-1927  
Application No. 08/990,754

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ON BRIEF

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Before JERRY SMITH, FLEMING, 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 1-6 and 16.

We reverse.

BACKGROUND

The invention is directed to a semiconductor device which is reduced in resistance. Claim 1 is reproduced below.

1. A semiconductor device comprising:
  - a first conductivity type semiconductor substrate;
  - an isolation insulator film formed on an isolation region of a major surface of said semiconductor substrate;
  - a second conductivity type source and a second conductivity type drain formed at an active region being enclosed with said isolation region on said major surface of said semiconductor substrate;
  - a gate electrode formed on a major surface of said active region through a gate insulator film;
  - metal compound layers formed on surfaces of said source and said drain and that of said gate electrode respectively; and
  - second conductivity type first impurity layers formed on boundary portions between said source and said drain and said isolation region to be deeper than said source and said drain, wherein the first impurity layers have an impurity concentration lower than that of the source and the drain.

The examiner relies on the following references:

Hori et al. (Hori)	5,320,974	Jun. 14, 1994
Murakami et al. (Murakami)	5,623,154	Apr. 22, 1997 (filed Jun. 7, 1995)

Claims 1-6 and 16 stand rejected under 35 U.S.C. § 103 as being unpatentable over Murakami and Hori.

Claims 7 through 15 have been withdrawn from consideration.

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We refer to the Final Rejection (mailed Jan. 7, 2000) and the Examiner's Answer (mailed Jun. 20, 2000) for a statement of the examiner's position and to the Brief (filed May 11, 2000) and the Reply Brief (filed Jun. 29, 2000) for appellants' position with respect to the claims which stand rejected.

### OPINION

With respect to independent claim 1, the examiner presents alternative reasoning in the section 103 rejection over Murakami and Hori. First, the examiner submits the view that it would have been obvious to form an LDD (lightly doped drain) structure comprising source and drain regions having high concentration (n+) in the structure shown in Murakami's Figure 35. (Answer at 4-5.) The examiner urges that, in the alternative, it would have been obvious to form a leakage current prevention region in a transistor as shown in Murakami's Figure 24. (Id. at 5) In either case, the rejection relies on Hori to show obviousness of using metal compound layers on surfaces of the source, drain, and gate, for the purpose of providing electrical connections to the device. (Id. at 6.)

Appellants argue in the briefs that the references do not provide motivation for the proposed modifications, and that Murakami in particular teaches away from appellants' invention. The examiner considers the arguments that Murakami teaches away from the invention to be not persuasive, because the invention described by Murakami (e.g., Figure 1) was not relied upon for the rejection. "Admitted Prior Art

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(figures 24-35) of Murakami...is the only portion which was used to reject the claimed invention.” (Answer at 8.)

However, we agree with appellants that a reference must be considered in its entirety, including portions that may teach away from the claimed invention. “A reference may be said to teach away when a person of ordinary skill, upon [examining] the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” Para-Ordnance Mfg. v. SGS Importers Int’l, 73 F.3d 1085, 1090, 37 USPQ2d 1237, 1241 (Fed. Cir. 1995) (quoting In re Gurley, 27 F.3d 551, 553, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994)).

Here, Murakami describes prior art efforts to overcome crystal defects 50 in the prior art structure of Figure 24. Col. 3, ll. 5-16. The reference goes on to describe a way to remedy the defects, by inclusion of a portion 313 (Fig. 35) to prevent leakage current due to crystal defects. Col. 3, ll. 23-59. However, the reference warns that the construction of Figure 35 has distinct disadvantages. Col. 3, l. 60 - col. 4, l. 4. Murakami’s purported improvement over the prior art includes a p-type impurity diffusion region 13 formed between isolating oxide film 5 and n-type source/drain region 11. Col. 7, ll. 26-60; Fig. 1.

We thus conclude that Murakami would not have suggested modifying the structure of Figure 24 by adding an n-type impurity region (as shown in Fig. 35), and would have discouraged the artisan from such endeavor. Further, we agree with

appellants that the references would not have suggested modifying the structure of Figure 35 by using an n- and n+ structure for the source or drain structure, as shown in Figure 24. Murakami teaches that the structure of Figure 35 has inferior properties in comparison to the inventive structure shown in Figure 1. As such, in our opinion the artisan would not have sought to make modifications to what Murakami teaches to be a basically defective structure, when Murakami also teaches a different approach to the problem which results in a more robust solution.

We note a factual question that we cannot resolve on this record. Murakami defines (e.g., col. 1, ll. 25-31) an LDD structure as consisting of an n- impurity region and an n+ impurity region. Murakami's definition appears consistent with that of appellants. (See Brief, sentence bridging pp. 4 and 5.) Yet, Murakami refers to Figure 35 as an LDD structure (col. 3, ll. 41-45), but shows a source/drain consisting of an n- (307) and an n (309) region.

The examiner submits reasons (Answer at 9-10) why the actual concentration of the Figure 35 structure should be considered as having relatively low and relatively high (n- and n+) impurity concentrations in the source/drain, notwithstanding the relative concentrations indicated by the drawing. However, the examiner does not provide evidence for the assertions.<sup>1</sup> Appellants, in response, focus on the drawings of

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<sup>1</sup> Moreover, we observe that Murakami describes Figure 35 as representing a structure described in a Japanese disclosure. Murakami at col. 3, ll. 17-25. The rejection does not rely on the Japanese document. We have obtained a full English translation of the Japanese document (Kokai Patent Application No. 2-133929), dated May 2000. We are placing a copy of the English translation in the record for the examiner's review, and a copy of the translation is to mail with this decision.

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Murakami (e.g., Reply Brief at 1-2), but do not provide any explanation for the apparent discrepancy in the Murakami reference.

In any event, the allocation of burdens requires that the examiner provides the basis, in the first instance, for establishing prima facie obviousness of an invention. Since the examiner's theories regarding the actual concentrations of the structure of Murakami's Figure 35 appear based on speculation -- insufficient to support findings underlying a rejection -- appellants had no duty to explain their view of Murakami's discrepancy. Moreover, if Figure 35 of Murakami is, indeed, misleading or incorrect, then there may also be a question with respect to the actual relative concentration of the "n-type" region 313.

In summary, we are persuaded by appellants that the rejection fails to set forth a prima facie case for obviousness for the subject matter of claim 1. As the remainder of the claims on appeal incorporate the limitations of claim 1, we do not sustain the section 103 rejection of claims 1-6 and 16 as being unpatentable over Murakami and Hori.

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CONCLUSION

The rejection of claims 1-6 and 16 under 35 U.S.C. § 103 as being unpatentable over Murakami and Hori is reversed.

REVERSED

JERRY SMITH	)	
Administrative Patent Judge	)	
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	)	BOARD OF PATENT
MICHAEL R. FLEMING	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
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HOWARD B. BLANKENSHIP	)	
Administrative Patent Judge	)	

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