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**D E C I S I O N**  
**of 17 February 2000**

**Case Number:** T 0631/97 - 3.4.3

**Application Number:** 88311511.5

**Publication Number:** 0328819

**IPC:** H01L 21/22

**Language of the proceedings:** EN

**Title of invention:**

Making of doped regions using phosphorus and arsenic

**Applicant/Patentee:**

KABUSHIKI KAISHA TOSHIBA

**Opponent:**

-

**Headword:**

Doped regions/TOSHIBA

**Relevant legal provisions:**

EPC Art. 82, 97, 111(2), 150

PCT Art. 17.3(a)

EPC R. 46, 86(4), 112

PCT R. 13.1, 13.2

Guidelines B-III, 4.2, C-III, 7.10, C-VI, 3.2a, C-VI, 8.5

**Keyword:**

Non-payment of further search fees

**Decisions cited:**

G 0002/92, T 0355/94, T 1109/96, T 0178/84, T 0087/88

**Headnote:**

"Having regard to Opinion G 2/92, in a case where an applicant fails to pay further search fees when requested to do so by

the search division under Rule 46(1) EPC, Rule 46 EPC does not prohibit a review by the examining division of the correctness of the search division's finding of lack of unity of invention."



Case Number: T 0631/97 - 3.4.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.3  
of 17 February 2000

**Appellant:** KABUSHIKI KAISHA TOSHIBA  
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Kanagawa-ken 210-8572 (JP)

**Representative:** Freed, Arthur Woolf  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 31 January 1997  
refusing European patent application  
No. 88 311 511.5 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** R. K. Shukla  
**Members:** G. L. Eliasson  
M. J. Vogel

## Summary of Facts and Submissions

I. Following the filing of European patent application no. 88 311 511.5, the search division of the EPO issued a Partial Incomplete European Search Report pursuant to Rule 46(1) EPC in respect of the subject matter of claims 1 and 2, with an invitation to pay further search fees in respect of three further inventions. The applicant did not respond to the invitation to pay further search fees.

II. Claims 1 and 2 of the application as filed read as follows:

"1. A method of manufacturing a semiconductor device characterised by the steps of:

- a) introducing arsenic into a predetermined portion (16) of a silicon body (11), and
- b) introducing phosphorus into said predetermined portion (16) after said step of introducing arsenic, thereby forming in the silicon body (11) an N-type impurity region (19) including arsenic and phosphorus."

"2. A method according to claim 1 wherein:  
said step of introducing arsenic comprises the step of ion implanting arsenic, and said step of introducing phosphorus comprises the step of diffusing phosphorus."

III. Claim 8 which was considered by the search division to relate to a third invention had the following wording:

- "8. A method of manufacturing a semiconductor device characterised by the steps of:
- a) patterning an isolation field oxide layer (12) surrounding a predefined active area of a silicon substrate (11);
  - b) forming an insulating film (13) on the surface of the predefined active area of the silicon substrate (11);
  - c) depositing a first polysilicon layer (17) to cover substantially the substrate surface of the predefined active area;
  - d) patterning the polysilicon layer (17) and the insulating film (13) to expose the surface of a predetermined portion (16) in the active area of the silicon substrate (11);
  - e) introducing arsenic into said predetermined portion (16);
  - f) depositing a second polysilicon layer (20) to cover substantially the substrate of the predefined active area;
  - g) introducing phosphorus into said predetermined portion (16) after said step of introducing arsenic and depositing a second polysilicon layer (20);
  - h) patterning said second polysilicon layer (20) to form a wiring layer."

IV. During the examination proceedings, the examining division reviewed the finding of lack of unity of invention of the search division following the practice as set out in the Guidelines, C-III, 7.10 and C-VI, 3.2a, which refers to the Opinion G 2/92. The examining division did not agree with the finding of the search division on the lack of unity of invention.

The application was refused in a decision of the examining division dated 31 January 1997, on the ground that the subject matter of claims 1-3 lacked novelty with respect to a prior art document

D3: EP-A-0 137 645.

V. The appellant (applicant) lodged an appeal on 27 March 1997, paying the appeal fee the same day, and filed a statement of the grounds of appeal on 28 May 1997 together with amended claims 1-9. The appellant requested that the decision under appeal be set aside and a patent be granted based on these claims. Furthermore, oral proceedings were requested in the event of any adverse decision.

VI. Oral proceedings were held on 17 February 2000 in the absence of the appellant who had informed the Office in advance that he would not be attending the oral proceedings. At the oral proceedings, the request made by the appellant in the statement of grounds of the appeal was considered.

VII. Claim 1 of the applicant's request reads as follows:

"1. A method of manufacturing a semiconductor device comprising the steps of:

providing a silicon substrate (11) having an active area (16) located at a surface of the substrate (11);  
patterning an insulating film (13) on the surface of the substrate (11);  
depositing a first poly-silicon layer (17) on the insulating film;  
forming a photoresist (18) on the first poly-silicon layer;  
removing portions of at least the first poly-silicon layer and the insulating layer to define a passage (15) above the active area (16) that exposes said active area (16);  
implanting arsenic into said active area (16);  
removing the photoresist (18);  
depositing a second poly-silicon layer (20) on the first poly-silicon layer (17), said second poly-silicon layer having a first portion and a second portion, which second portion covers the active area (16);  
diffusing phosphorus through the second portion of the second poly-silicon layer (20) and into said active area (16) while the active area (16) remains covered by the second portion of the second poly-silicon layer; and  
patterning the second poly-silicon layer (20) to form a wiring layer."

### **Reasons for the decision**

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is therefore admissible.
  
2. Present claim 1 is based on original claim 8 and

contains the following additional features:

- (a) a photoresist (18) is used in the method (lines 6 and 10);
- (b) arsenic is specified to be ion-implanted (line 9);
- (c) the second polysilicon layer (20) is **on** the first polysilicon layer (17); and
- (d) phosphorus is incorporated by diffusion (line 14).

As stated in paragraph I above, claim 8 as filed was found by the search division to relate to "third invention". A search fee was not paid in respect of this claim, so that the subject matter of claim 8, and consequently of the present claim 1 was not searched.

3. *Interpretation of Rule 46(1) EPC*

3.1 Under Article 82 EPC, a patent may only be granted when the requirement of unity of invention is met, i.e. the application relates to a single invention or to a group of inventions so linked as to form a single general inventive concept. The examining division is responsible for examining unity of invention whose decisions may be contested and reviewed by the boards of appeal.

3.2 Under the provisions of Rule 46(1) EPC, the search division also deals with the question of unity of invention for the purpose of drawing up a European search report. If the search division considers that the application lacks unity of invention, it shall draw up a partial search report on the first invention. A

search report on the other inventions will only be drawn up in respect of which further search fees have been paid within the prescribed time limit. In case further search fees have been paid, the applicant may request and receive a refund of the further search fees in accordance with Rule 46(2) EPC, if the examining division finds that, contrary to the opinion of the search division, the requirements of unity of invention are met.

3.3 The situation where the search division has drawn up a partial search report under Rule 46(1) EPC and the applicant has not responded to the invitation to pay further search fees for all further inventions gives rise to the question whether the examining division has the authority to examine the entire application including unsearched subject matter for unity of invention under Article 82 EPC, as is the case in the present appeal, or is the examining division bound to limit this examination to those inventions for which search fees were paid so that the applicant cannot pursue the application for the subject matter in respect of which no search fees have been paid.

3.4 The effect of Rule 46(1) EPC in case of non-payment of additional search fees when the applicant was invited to do so was considered in Opinion G 2/92 (OJ EPO 1993, 591) and in several subsequent decisions of the boards of appeal, decisions T 355/94 and T 1109/96 (both not published in the Official Journal) being relevant to the present case.

In G 2/92, the President of the EPO referred the following point of law to the Enlarged Board of Appeal:

"Can an applicant who fails to pay further search fees for **a non-unitary application** when requested to do so by the Search Division under Rule 46(1) EPC pursue that application for the subject-matter in respect of which no search fees have been paid or must he file a divisional application for it?" (emphasis by the present Board ).

The Enlarged Board ruled that "In the case of **a non-unitary application** the applicant cannot pursue that application for the subject-matter in respect of which no search fees have been paid" (emphasis by the present Board). In the opinion of the Enlarged Board, such an applicant must file a divisional application in respect of such subject-matter if he wishes to seek protection for it.

3.5 In decision T 1109/96 the Board interpreted Rule 46 EPC and G 2/92, and held that in examination proceedings the issue of unity of invention is open to discussion only in respect of the subject matter for which search fees were paid. In this case, the decision of the examining division refusing the European patent application on the ground that it did not comply with the requirements of Rule 46(1) EPC, since it sought protection for subject matter for which no search fees were paid, was upheld by the Board.

3.6 The present Board, however, does not share the view held in T 1109/96. In the present Board's view, it follows from the heading of Rule 46 EPC, "European search report where the invention lacks unity of invention" and the provisions of Rule 46(1) EPC that the search division considers the question of unity of invention with a view to establishing whether or not a

partial search report is to be issued, and not to establish whether or not the application as filed meets the requirement of unity of invention under Article 82 EPC. Moreover, during the search stage Rule 46(1)EPC does not provide the applicant any opportunity to dispute the finding of lack of unity. Also, since pursuant to Article 97 EPC, the responsibility for establishing whether the application as filed meets the requirements of the Convention, including the requirement of unity of invention under Article 82 EPC, ultimately rests with the examining division, the search division's opinion on lack of unity of invention cannot be regarded as final and binding to the examining division. Thus Rule 46(1) EPC on its proper interpretation does not prohibit a review by the examining division of the search division's opinion on lack of unity of invention where further search fees are not paid. Furthermore, Rule 46(2) EPC deals only with the situation when the further search fees have been paid, and in the present Board's view does not bar the examining division from reviewing the findings of the search division when no further search fees have been paid. A narrow interpretation of Rule 46(1) EPC whereby the finding of lack of unity of invention by the search division is considered as final where the additional search fees are not paid would deprive the applicant of an opportunity to dispute the finding of the search division during the examination proceedings and would also unjustifiably restrict the power of the examining division on the question of unity of invention to the subject matter for which search fees were paid.

- 3.7 The above interpretation of Rule 46(1) EPC is also in agreement with that of the Enlarged Board of Appeal in

Opinion G 2/92 for the following reasons:

- 3.7.1 In his letter of referral, the President discussed the contents of the two decisions T 178/84 (OJ EPO 1989, 157) and T 87/88 (OJ EPO 1993, 430) and the extent to which they deviated from each other, as well as to the practice within the EPO at that time in respect of the examination of unity of invention, as set out in the Guidelines, C-VI, 3.2a. In particular, the letter of referral pointed out under item 3.1.2 that under the practice at that time, the examining division was obliged to review the finding of non-unity by the search division, even if the applicant had not responded to the invitation under Rule 46(1) EPC to pay further search fees. If the examining division did not agree with the search division and no further search fees were paid, an additional search may be carried out as set out in the Guidelines, B-III, 4.2.
- 3.7.2 Thus, in the light of the discussion in the letter of referral, the expression "for a non-unitary application" in the question of law clearly implies that the application is non-unitary as considered by the examining division upon review of the search division's opinion on lack of unity. The answer in G 2/92 containing the same expression, "a non-unitary application", in absence of any indication to the contrary, has therefore to be interpreted having regard to the circumstances set out in the letter of referral of the President of the EPO. Thus, in the present Board's view, in G 2/92, "a non-unitary application" in the answer of the Enlarged Board means that the application is non-unitary when the examining division upon review agrees with the opinion of the search division. This interpretation is supported by the fact

that although the Enlarged Board refers to the above-mentioned practice within the EPO, as set out in the Guidelines, C-VI 3.2a, it nowhere mentions or implies that the practice, i.e. a review of the search division's opinion on lack of unity during the examination proceedings when further search fees were not paid, would be at variance with its interpretation of Rule 46(1) EPC, and that the Guidelines required to be amended.

3.7.3 In G 2/92, the Enlarged Board stated in paragraph 3 of the "Reasons for the Decision":

"Consequently, in the circumstances of decision T 87/88 (referred to in paragraph III above), the failure by the applicant to pay the additional fee..... should have resulted in the applicant being obliged to seek protection for the second invention in a divisional application, as held by the Examining Division in that case. In such circumstances, a review of the correctness of the Search Division's request for an additional search fee is not in accordance with Rule 46 EPC on its proper interpretation."

It is evident that the last statement is restricted to the circumstances of the case in decision T 87/88, wherein the search division established a partial search report in view of the non-payment of a further search fee in respect of a second invention and the examining division refused the application on the basis of Article 97(1) EPC, since upon review of the finding of lack of unity of invention, the examining division agreed with the search division and considered that the subject-matter of the claims of the applicant's main and auxiliary requests was not concerned with the

invention in respect of which the search was carried out (cf. paragraph IV of the "Summary of Facts and Submissions"). Moreover, in this case the Board of appeal reviewed the correctness of the request of the search division for the payment of an additional search fee, although this was not disputed by the examining division, and held that the request for an additional search fee was not justified (cf. paragraphs 6.1 to 6.3).

It thus follows from the above analysis of the circumstances of the case T 87/88 that in the second sentence in paragraph 3, the Enlarged Board is referring to the review by the Board, and not by the examining division, of the correctness of the request of the search division for the payment of an additional search fee.

3.7.4 The above interpretation of the statement in paragraph 3 in G 2/92 is supported by the decision T 355/94. In this case, the Board referred to the above cited statement in G 2/92 and held that it had no power to reopen the matter, i.e. it had no power to review the correctness of the search division's request for an additional search fee. In this case also, the examining division had agreed with the finding of the search division that the originally filed claims lacked unity of invention. Nevertheless, the Board did not rule that the examining division had no power to review the correctness of the finding of lack of unity by the search division.

3.8 In summary therefore, having regard to the Opinion G 2/92, in a case where an applicant fails to pay additional search fees when requested to do so by the

search division under Rule 46(1) EPC, Rule 46 EPC does not prohibit a review by the examining division of the correctness of the search division's finding of lack of unity of invention. The examination procedure as set out in the Guidelines, C-III, 7.10 and C-VI, 3.2a is thus in line with the Opinion G 2/92.

- 3.9 Rule 86(4) EPC as well as the regulations regarding lack of unity for international applications where the EPO is designated or elected office in the regional phase support the above view:
  - 3.9.1 In accordance with Rule 86(4) EPC, amended claims may not contain unsearched subject matter which does not combine with the originally claimed invention to form a single inventive concept. Thus, an applicant who during the examination proceedings files amended claims containing unsearched subject matter is entitled to receive a reasoned opinion of the examining division on the question of lack of unity of invention in respect of the unsearched subject matter of the amended claims, although no search fees were paid in respect of the unsearched subject matter. Also, in this case, he is entitled to an appealable decision on lack of unity of invention from the examining division. Following the interpretation of Rule 46(1) EPC according to T 1109/96, on the other hand, an application with non-unitary claims at the search stage would be examined for lack of unity of invention during the examination proceedings, and the applicant would receive a reasoned finding of the examining division on this issue, only when the requested search fees were paid beforehand. Thus, the procedures following Rule 46(1) EPC and Rule 86(4) would not be mutually consistent, and the procedure following Rule 46(1) would be unfair to an

applicant who fails to pay the additional search fees at the search stage.

- 3.9.2 The present practice of search and examination of international applications under the PCT where the EPO is elected or designated office (so-called Euro-PCT applications) are also consistent with the above view: Rule 112 EPC which enters into force on 1 March 2000 (OJ EPO 1999, 660-667) requires that the EPO examines the requirement unity of invention of an international application entering the EPO as a Euro-PCT application, also for the case when the International Search Authority (ISA) considered that the application did not comply with the requirement of unity of invention (Rules 13.1 and 13.2 PCT), and the applicant did not pay additional search fees according to Article 17.3(a) PCT. The requirement of unity defined in Rules 13.1 and 13.2 PCT has the same wording as in Article 82 and Rule 30 EPC, respectively. Therefore, if Rule 46(1) EPC would have the effect of excluding unsearched subject matter as held in T 1109/96, the EPO acting as an ISA would treat European and International applications regarding unity of invention differently, despite the same regulations for both international and European applications: Under Rule 112 EPC, the examining division would have to review the entire International application for the requirement of unity of invention when the ISA was of the opinion that the application was non-unitary, and this regardless of whether or not further search fees were paid. For a European application however, such a review would not be possible when all further search fees were not paid. In the light of Article 150 EPC which requires a Euro-PCT application to be treated as a European application, it is clear that the Contracting States of the EPC did not

intend to treat an applicant who files an application directly with the EPO worse than one who enters the EPO as a Euro-PCT application. Therefore, Rule 46(1) EPC as interpreted in the light of the Euro-PCT procedure neither puts limits on the competence of the examining division to examine unity of invention. On the contrary, the examining division is entitled and obliged to consider the entire application as filed in its assessment of unity of invention without payment of further fees by the applicant.

4. The subject matter of present claim 1 has been substantially changed from that considered in the decision under appeal. Moreover, claim 1 contains feature (c) referred to in point 2.1 above which was previously not claimed, and was therefore apparently neither searched nor considered in the decision under appeal. It therefore should be considered whether an additional search as provided in the Guidelines B-III, 4.2(iii) and C-VI, 8.5 should be carried out or not. This question however lies within the discretion of the examining division. It is therefore appropriate to remit the case under Article 111(2) EPC to the examining division for further prosecution.

## **Order**

### **For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the department of the first instance for further prosecution on the basis of claims 1 to 9 filed with the statement of the grounds

of appeal on 28 May 1987.

The Registrar:

The Chairman:

D. Spigarelli

R. K. Shukla