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**Datasheet for the decision
of 7 May 2012**

Case Number: T 1625/09 - 3.4.01

Application Number: 99932677.0

Publication Number: 1095282

IPC: G01R 1/073

Language of the proceedings: EN

Title of invention:

Multi-point probe

Patentee:

Capres A/S

Opponents:

SmartTip BV
Octrolix B.V.

Headword:

-

Relevant legal provisions:

EPC Art. 100(b)
RPBA Art. 13(1)

Relevant legal provisions (EPC 1973):

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Keyword:

"Sufficiency of disclosure (no)"
"Admissibility of late-filed requests (no)"

Decisions cited:

-

Catchword:

-



Case Number: T 1625/09 - 3.4.01

D E C I S I O N
of the Technical Board of Appeal 3.4.01
of 7 May 2012

Appellant I: SmartTip BV
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Respondent: Capres A/S
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 22 June 2009
rejecting the opposition filed against European
patent No. 1095282 pursuant to Article 101(2)
EPC.

Composition of the Board:

Chairman: G. Assi
Members: H. Wolfrum
J. Geschwind

Summary of Facts and Submissions

- I. Both opponents lodged an appeal against the decision of the opposition division, dispatched on 22 June 2009, rejecting the oppositions against European patent No. 1 095 282. The notice of appeal by appellant/opponent I (SmartTip BV) was received on 5 August 2009 and the prescribed fee was paid on the same day. The notice of appeal by appellant/opponent II (Octrolix B.V.) was received on 14 August 2009 and the prescribed fee was paid on the same day. Appellant I filed a statement of grounds of appeal on 20 October 2009 and appellant II filed a statement of grounds of appeal on 21 October 2009.

Both appellants raised objections under Article 100(a) EPC in conjunction with Articles 52(1) and 56 EPC. Furthermore, appellant I raised objections under Articles 100(b) and 100(c) EPC.

- II. The opposition of opponent I had been based on the grounds of lack of inventive step (Article 100(a) EPC in conjunction with Articles 52(1) and 56 EPC) and insufficiency of disclosure (Article 100(b) EPC).

The opposition of opponent II had been based on the ground of lack of inventive step (Articles 100(a) and 56 EPC).

Subsequent to the decision taken by the opposition division and prior to the filing of the appeal, both opponents wrote letters drawing attention to perceived deficiencies in the Reasons of the decision and in the minutes of the oral proceedings before the opposition

division. In particular, opponent I requested that the minutes and the Reasons reflected the fact that it had raised an objection under Article 123(2) EPC in these oral proceedings and that the opposition division should thus have considered whether the fresh ground of opposition of Article 100(c) EPC was *prima facie* relevant. Opponent II requested the opposition division to make an addendum to the minutes. The opposition division rejected these requests.

- III. In its reply of 19 January 2010 to the grounds of appeal the respondent/patent proprietor (Capres A/S) traversed the objections as to insufficiency of disclosure, lack of inventive step and added subject-matter.
- IV. On 7 February 2012 the parties were summoned to oral proceedings and on 23 February 2012 the Board issued a communication pursuant to Article 15(1) RPBA providing a preliminary opinion on the issues under discussion.
- V. By letters dated 23 March 2012 and 30 March 2012 and in the form of a "third party observation" received on 25 April 2012, appellant I underpinned its position on the matter of insufficiency of disclosure and provided in support thereof various documents and a CD-ROM including documents which report results of measurements performed on and with multi-point probes having a structure in accordance with claim 1 of the patent in suit.
- VI. By letters dated 4 April 2012 and 10 April 2012 the respondent objected to the admission into the proceedings of the fresh ground of opposition under

Article 100(c) EPC. Moreover, it traversed the objections raised against the patent as granted and filed documents F1 to F8 in support of its position, including documents :

- F2: a report with the title "Experimental data from measurements using a Capres microscopic four-point probe with and without active guarding" (this document was also referred to by appellant I in the letter of 23 March 2012 as "enclosure 23");
- F4: a declaration of Prof. R. F. Wolffenbuttel entitled "Suitability of the M4PP microprobe for 4-point resistance measurements with active guarding"; and
- F8: Keithley Instruments, "Low Level Measurements Handbook", 5th edition June 1998.

Furthermore, the respondent filed fifteen auxiliary requests with the letter of 4 April 2012, the main request being the dismissal of the appeals.

VII. Oral proceedings were held on 7 May 2012.

Appellant I requested that the decision under appeal be set aside and the patent be revoked in its entirety.

Appellant II requested that the decision under appeal be set aside and the patent be revoked in part, as far as claims 1, 2 and 45 of the patent as granted are concerned.

The respondent requested, by way of a main request, that the appeals be dismissed or, in the alternative, that the patent be maintained in amended form on the

basis of one of the fifteen auxiliary requests filed with the letter of 4 April 2012.

Moreover, the respondent requested that, provided the Board considered the fresh ground for opposition under Art. 100(c) EPC raised by appellant I to be admissible under Art. 114(1) EPC, the case be remitted to the first instance for further prosecution and the patent proprietor be compensated for the procedural costs, including remuneration of the representative, for the costs of the first opposition and for the subsequent appeal of the decision. Alternatively it was requested that, if the Board considered there being a violation of Art. 100(c) EPC and if the case was not remitted to the first instance, the term "leakage" was changed to "leakage resistance" on col. 6, l. 21, and col. 13, l. 21, of the granted patent.

VIII. Independent claims 1 and 15 of the patent as granted read as follows :

"1. A multi-point probe for testing electric properties on a specific location of a test sample said probe comprising:

(a) a supporting body (12) originating from a wafer body and defining a first surface (16);

(b) a first multitude of conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) each of said conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) defining a proximal end and a distal end being positioned in co-planar relationship with said first surface (16) of said supporting body (12), and said conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) being connected to said supporting body

(12) at said proximal ends thereof and having said distal ends freely extending from said supporting body (12), giving individually flexible motion to said first multitude of conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d), and

(c) said conducting probe arms originating from a process of producing said multi-point probe including producing by deposition said conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) on said wafer body in facial contact with said wafer body and removal of a part of said wafer body providing said supporting body (12) and providing said conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) freely extending from said supporting body (12),

(d) said multi-point probe further comprising a second multitude of conductive electrodes being positioned on a second multitude of areas defined between said first multitude of conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) on a second surface (16) swaged in relation to the plane of said first surface (16) of said supporting body (12), and comprising an insulating spacing between said electrodes and said conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d), said second multitude of conductive electrodes especially being suitable for active guarding."

"45. A multi-point testing apparatus for testing electric properties on a specific location of a test sample, comprising:

(i) means for receiving and supporting said test sample;

(ii) electric properties testing means including electric generator means for generating a test signal

and electric measuring means for detecting a measuring signal;

(iii) a multi-point probe according to any of the claims 1 to 44, said multi-point probe communicating with said electric properties testing means; and
(iv) reciprocating means for moving said multi-point probe relative said test sample so as to cause said conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) to be contacted with said specific location of said test sample for performing said testing of electric properties thereof."

Claims 2 to 44 and 46 to 53 are dependent claims.

IX. As far as relevant for the present decision, the arguments of the parties may be summarized as follows:

Appellant I questioned the fact that the patent would provide sufficient technical information with respect to active guarding by the second multitude of electrodes as claimed in feature (d) of claim 1 of the patent in suit so as to successfully improve measuring accuracy. According to appellant I, there was no problem with current leakage between the conductive probe arms, in the first place. But even if such a problem existed, it could not be solved by the mere presence of the second multitude of electrodes at the indicated areas. It did not suffice that the claimed probe as such could be made if the probe did not solve the problem of improving measuring accuracy. The very presence of the second multitude of electrodes in-between the probe arms even aggravated a risk of current leakage, if there was any. Moreover, in the absence of any experimental example in the patent

documents, the ordinary skilled person did not know how to achieve an improved measuring accuracy and could not work out without undue burden the measures to be taken in order to solve the posed problem.

Appellant II shares this view.

According to the respondent, the claimed subject-matter concerned a multi-point probe as such and the patent specification provided ample information as to how a probe having the claimed structure could be obtained. Already for this reason, it was not necessary to disclose how the probe was operated so as to achieve active guarding. Moreover, since active guarding was a generally known technique, there was no need for any further disclosure in this respect. This notwithstanding, feature (d) of claim 1 of the patent as granted allowed for active guarding of the probe arms and thus solved the objective technical problem of achieving a reduction of the current leakage from the probe arms. In this context, it did not suffice for the appellants to show that a leakage problem did not exist for an isolated probe structure or for a specific type of measurement technique (such as a DC measurement). Rather, evidence was needed that the problem was inexistent for all possible types of measurements (including measurements at different frequencies). The claimed probe was a probe for high-impedance DC and AC measurements. It was textbook knowledge, as evidenced for instance by document F8, that for such measurements the current injecting electrode of a multi-point probe had to be actively guarded so as to avoid leakage currents. The fact that a potential difference then occurred between the guard and a ground electrode was

of no relevance for successful active guarding. In this context, test report F2 and the supplementary explanations given in the declaration F4 provided ample evidence that measurement accuracy could be improved for a multi-point probe with active guarding by means of a second multitude of electrodes as specified in feature (d) of claim 1.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 99 EPC and is, therefore, admissible.
2. *Respondent's main request (sufficiency of disclosure (Article 100(b) EPC))*
 - 2.1 It is in dispute between the parties whether the patent provides sufficient information so as to enable the skilled person to obtain a multi-point probe for testing electric properties on a specific location of a test sample, which allows for an increased measuring accuracy by means of the provision of a second multitude of conductive electrodes which especially are suitable for active guarding, according to feature (d) of claim 1 of the patent as granted.
 - 2.2 The term "active guarding" is conventionally understood as a technique of shielding a measurement electrode by means of an adjacent (or even surrounding) guard electrode which is held near or at the same potential as the measurement electrode (see for instance document F4, page 9, the framed paragraph before line 25).

As regards "active guarding", claim 1 of the patent as granted associates the desired function "especially being suitable for active guarding" to a second multitude of conductive electrodes for which it is required that they are positioned on a second multitude of areas which are defined on the surface of the supporting body between the first multitude of conductive probe arms in a swaged relationship to the probe arms, an insulating spacing existing between said electrodes and said conductive probe arms.

Figure 6 of the patent, which illustrates the sole embodiment of the claimed invention, shows a testing probe with four probe arms and five "guard" electrodes arranged so that a "guard" electrode is provided on the supporting body at both sides of each probe arm. According to the corresponding description in paragraphs [0024] and [0053] of the patent specification, such an arrangement of electrodes is used for active guarding with the aim of increasing the measuring accuracy. No further information is provided by the patent in this respect.

2.3 In the Board's understanding, appellant I rightfully questions that the arrangement of guard electrodes as taught by the patent specification and claim 1 under consideration can improve the measuring accuracy of a multi-point testing probe by active guarding.

Indeed, active guarding in the conventional understanding of the term would require for each measuring electrode, ie for each probe arm in the case of the claimed testing probe, an individual guard

electrode which needs to be held at the actual potential of the measuring electrode or probe arm. However, this would be impossible for an electrode arrangement which foresees only one guard electrode between any two adjacent probe arms, as in normal use the probe arms will be at different potentials and the guard electrode can only be held at one potential at a time. Moreover, active guarding of one probe arm of a pair of adjacent probe arms by the intermediate guard electrode would deteriorate the leakage resistance to the other probe arm.

It rather appears that the very provision of a second multitude of conductive electrodes as claimed by claim 1 of the patent and illustrated in the sole embodiment would inevitably deteriorate the measuring accuracy in comparison to a conventional multi-point testing probe having no such extra electrodes so that the specific problem underlying the provision of these electrodes is not solved.

- 2.4 Referring to textbook knowledge such as provided by document F8, the respondent argues that active guarding was required for improving the accuracy of high impedance measurements for testing electric properties on a specific location of a test sample, but that to this end only the current injecting electrode needed to be guarded.

The Board does not dispute the fact that active guarding, if correctly executed, may improve measuring accuracy, nor the validity of the textbook knowledge according to document F8. The decisive question is, however, whether the arrangement of electrodes between

the probe arms of a multi-point testing probe as claimed and disclosed by the patent in suit can solve the posed problem of improving measuring accuracy.

In this respect, document F8 does not support the respondent's assertions. The key statement from document F8 on which the respondent bases its argument is given in the second paragraph of page 4-27 and reads: *"To avoid leakage currents, use either isolated or guarded probes to make contact with the sample. The current source should be in the guarded mode. See section 2.2.1 for a more detailed discussion of guarding."*

However, document F8 simply does not deal with the specific problem of parasitic leakage which is associated with the provision of an intermediate guard electrode between closely spaced probe arms of a miniaturized testing probe. When it comes to the guarding of leads and contacts, document F8 requires them to be individually shielded (see for instance the section "Overview" of chapter "4.4.3 Resistivity Measurements of Semiconductors" on page 4-24 of document F8). As a matter of fact, the very presence of a single electrode between two adjacent probe arms, which in normal use of a testing probe will possess different potentials, introduces or aggravates leakage problems as compared to an arrangement without such an electrode. Reference can be made here to the illustrative presentation on pages 1 to 8 of the notice of opposition filed by opponent I as well as to document F4 produced by the respondent. On pages 6 and 7 of document F4, Prof. Wolffenbuttel, who acts as an expert on behalf of the respondent, analyzes the source

of parasitic impedances in a four-point testing probe equipped with a second multitude of electrodes for active guarding as claimed in claim 1 of the patent in suit. He arrives at the result that in such a probe the relevant parasitic impedances which affect the measurement accuracy are the parasitic impedances which occur between the second multitude of electrodes and the probe electrodes. In the framed paragraph on page 16 of document F4 it is stated that these parasitic impedances introduce two different sources of error, (i) an error due to current flowing into the (probe) electrode-to-guard (electrode) parasitic (impedance), and (ii) an error due to the parasitic impedance composed of the (probe) electrode-to-guard (electrode) parasitic impedances at the voltage sensing nodes. Error (i) is eliminated when applying the potential at the upper current driving node to the multitude of guard electrodes, whereas error (ii) is significantly reduced when applying the common-mode voltage to the multitude of guard electrodes.

From the cited statements of document F4 it can be concluded that the problem of parasitic impedances which affects the measurement accuracy would be inexistent in a (conventional) testing probe which does not possess the second multitude of electrodes for active guarding that are specified in claim 1 and illustrated in Figure 6 of the patent in suit. Moreover, it becomes apparent from document F4 that only one of the errors caused by the presence of the second multitude of electrodes can be compensated by active guarding at a time. These conclusions are confirmed by a further statement given in F4 (see the framed paragraph and the subsequent paragraph on

page 17) according to which perfect active guarding using a single guard potential is "formally" impossible.

Finally, the respondent refers to experimental results, such as summarized in document F2, as evidence for an improvement of measuring accuracy by active guarding of a multi-point testing probe. These results, however, are inconclusive because they do not compare measurements made with a probe according to claim 1 of the patent in suit with those made with a similar probe having no second multitude of electrodes. Instead, document F2 exclusively refers to measurements performed with testing probes equipped with a second multitude of electrodes, the only variations being the potentials applied to these electrodes.

- 2.5 In summary, it is found that the problem of improving the measuring accuracy as mentioned above for a multi-point probe for testing electric properties on a specific location of a test sample cannot be solved with a testing probe as claimed by claim 1 and illustrated in the sole embodiment of the patent in suit, which probe has a second multitude of conductive electrodes especially being suitable for active guarding in the claimed arrangement.

Therefore, the Board concludes that neither conventional knowledge nor the technical information provided by the patent in suit as to active guarding by the second multitude of electrodes enable a skilled person to successfully put the claimed invention into practice.

Consequently, the ground of opposition of Article 100(b) prejudices the maintenance of the patent as granted. The respondent's main request is therefore not allowable.

3. *Respondent's auxiliary requests 1 to 15 (admissibility)*

3.1 Article 13(1) RPBA stipulates that "Any amendment to a party's case after it has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy."

The criteria developed by the case law of the boards of appeal for exercising such discretion include, *inter alia*, the question whether or not the amendments proposed provide a solution to the issues in debate or rather are apparently deficient and raise new problems.

3.2 In the present case, the amendments proposed by auxiliary requests 1 to 10 do not overcome the objection under Article 100(b) EPC and thus would not be allowable for the same reasons as the respondent's main request. The respondent did not contest the fact that the objection also applied to these requests.

3.3 The amendment which is common to auxiliary requests 11 to 15 is the deletion of the phrase "*said second multitude of conductive electrodes especially being suitable for active guarding*" from claim 1.

In the respondent's view, the amendment should be allowed because it would render obsolete the debate concerning active guarding and thus would overcome the deficiency which the Board saw for the main request. On the other hand, the deleted feature was not a feature which limited in any way the structure of the claimed testing probe but only referred to a specific use thereof in that it concerned the suitability of the second multitude of electrodes for active guarding.

The Board does not share this view. Although from a purely linguistic point of view, the phrase "*especially being suitable for active guarding*" could be interpreted as defining only an optional property of the electrodes, such an interpretation would be in conflict with the content of the patent as a whole (Article 69 EPC) since the description in paragraphs [0024] and [0053] makes it clear that the sole purpose of providing these electrodes is their suitability for active guarding. Hence, the deleted phrase is to be perceived as constituting a functional definition of the second multitude of electrodes. Moreover, it implies certain structural restraints to the probe beyond the features expressly given in claim 1 of the patent in suit as to the mutual arrangement and interconnection of these electrodes as well as to necessary provisions for proper supply of the respective potentials required for active guarding.

Since amended claim 1 of each of auxiliary requests 11 to 15 refers to testing probes with a second multitude of electrodes which does not need to be suitable for active guarding and thus may serve any other function,

the scope of protection conferred would be extended, contrary to the provision of Article 123(3) EPC.

3.4 For the sake of completeness it is added that at least some of the amendments proposed in auxiliary requests 4, 5, 9, 10, 14 and 15 consist in the deletion of dependent claims and are not occasioned by a ground of opposition under Article 100 EPC. These amendments thus infringe the provision of Rule 80 EPC.

3.5 Therefore, the Board comes to the conclusion not to admit the respondent's auxiliary requests 1 to 15 into the proceedings.

4. *Respondent's further requests*

In view of the conclusions drawn above, there is no need to deal with the requests for remittal of the case and for amendment of the description of the granted patent.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar

The Chairman

R. Schumacher

G. Assi