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Wirth et al.

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(54) **OPTOELECTRONIC COMPONENT, DEVICE COMPRISING A PLURALITY OF OPTOELECTRONIC COMPONENTS, AND METHOD FOR THE PRODUCTION OF AN OPTOELECTRONIC COMPONENT**

USPC **257/79**; 257/98; 257/99; 257/E33.062; 257/E33.065; 257/E33.066; 257/E33.069; 438/22; 438/42

(58) **Field of Classification Search**
USPC 257/103, 99, 94, 96, 97, 98, 257/E33.055–E33.059, E33.062; 438/22, 438/26, 46, 212, 213
See application file for complete search history.

(75) Inventors: **Ralph Wirth**, Mintraching-Auhof (DE); **Herbert Brunner**, Sinzing (DE); **Stefan Illek**, Donaustauf (DE); **Dieter Eissler**, Nittendorf / Etterzhausen (DE)

(56) **References Cited**

(73) Assignee: **Osram Opto Semiconductors GmbH**, Regensburg (DE)

U.S. PATENT DOCUMENTS

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1634 days.

5,905,276 A 5/1999 Manabe et al.
5,977,565 A * 11/1999 Ishikawa et al. 257/81
(Continued)

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FOREIGN PATENT DOCUMENTS

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CN 1372329 10/2002 H01L 33/00
DE 43 36 891 5/1994

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(Continued)

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OTHER PUBLICATIONS

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(Continued)

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(74) *Attorney, Agent, or Firm* — Fish & Richardson P.C.

(30) **Foreign Application Priority Data**

Feb. 20, 2004 (DE) 10 2004 008 853

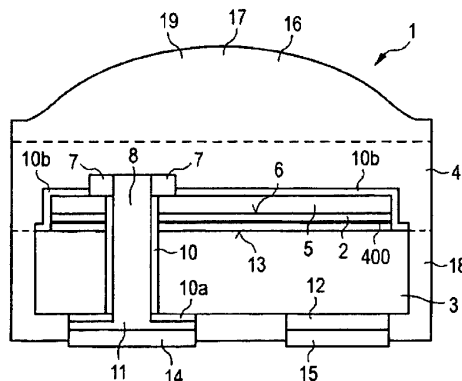
(57) **ABSTRACT**

(51) **Int. Cl.**
H01L 33/00 (2010.01)
H01L 31/0224 (2006.01)
H01L 33/38 (2010.01)

Disclosed is an optoelectronic component (1) comprising a semiconductor function region (2) with an active zone (400) and a lateral main direction of extension, said semiconductor function region including at least one opening (9, 27, 29) through the active zone, and there being disposed in the region of the opening a connecting conductor material (8) that is electrically isolated (10) from the active zone in at least in a subregion of the opening. Further disclosed are a method for producing such an optoelectronic component and a device comprising a plurality of optoelectronic components. The component and the device can be produced entirely on-wafer.

(52) **U.S. Cl.**
CPC **H01L 31/022408** (2013.01); **H01L 33/0079** (2013.01); **H01L 33/0095** (2013.01); **H01L 33/382** (2013.01); **H01L 31/022416** (2013.01)

20 Claims, 20 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

6,066,861 A 5/2000 Höhn et al.
 RE36,747 E 6/2000 Manabe et al.
 6,278,136 B1* 8/2001 Nitta 257/99
 6,281,524 B1 8/2001 Yamamoto et al.
 6,633,120 B2* 10/2003 Salam 313/499
 7,276,742 B2 10/2007 Kohno et al.
 2001/0042865 A1* 11/2001 Oshio et al. 257/100
 2002/0117681 A1 8/2002 Weeks et al.
 2003/0044872 A1 3/2003 Okuda et al.
 2004/0012958 A1 1/2004 Hashimoto et al.
 2004/0217360 A1* 11/2004 Negley 257/79
 2005/0012109 A1* 1/2005 Kohno et al. 257/103
 2005/0056855 A1 3/2005 Lin et al.

FOREIGN PATENT DOCUMENTS

DE 100 17336 10/2001

DE 10 2004012219 6/2005
 EP 1 460 694 9/2004
 JP 2001-339100 12/2001 H01L 33/00
 JP 2002-64112 2/2002 H01L 21/56
 JP 03-177080 6/2003 H01L 33/00
 JP 2004-530289 9/2003 H01L 21/28
 WO WO 98/12757 3/1998
 WO WO 02/069410 9/2002 H01L 33/00
 WO WO 03/044872 5/2003
 WO WO 03044872 A1* 5/2003

OTHER PUBLICATIONS

Notice of Allowance for Korean Patent Application No. 10-2012-7015400 dated Aug. 29, 2013 (3 pages).
 Authorized officer: Warner, A., *International Search Report*, PCT/DE2005/000281, Jul. 18, 2005.

* cited by examiner

FIG 4A

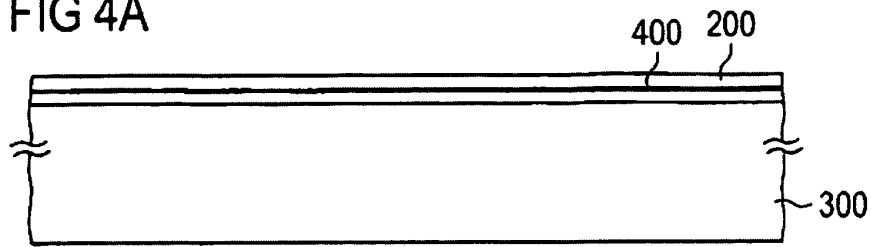


FIG 4B

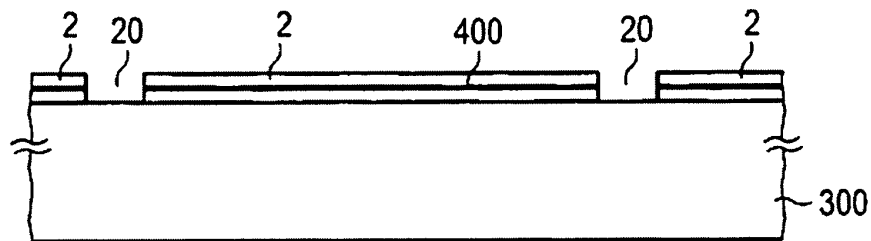


FIG 4C

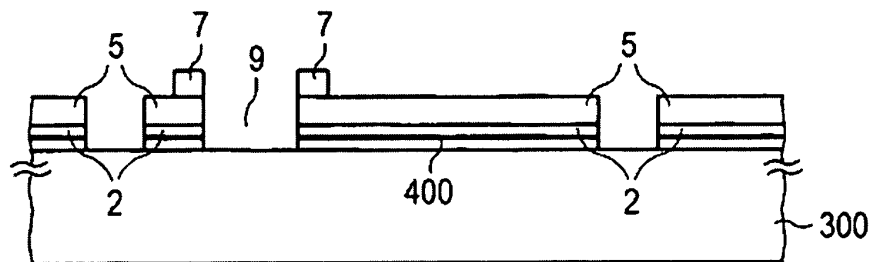
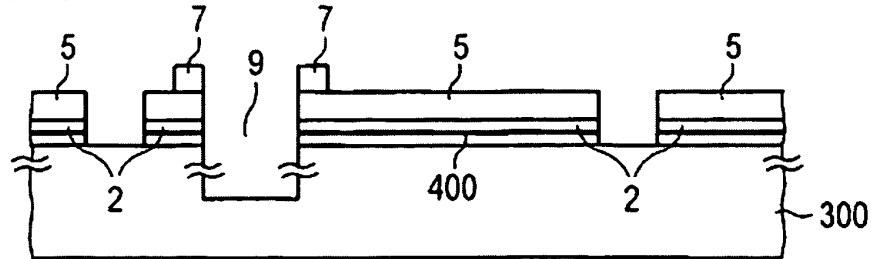


FIG 4D



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