17/05/02
2002029767

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

162162

(43) International Publication Date
25 May 2001 (25.05.2001)

PCT

(10) International Publication Number
WO 01/37327 A1

(51) International Patent Classification[7]: H01L 21/20

(21) International Application Number: PCT/US00/27354

(22) International Filing Date: 4 October 2000 (04.10.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/441,753 17 November 1999 (17.11.1999) US

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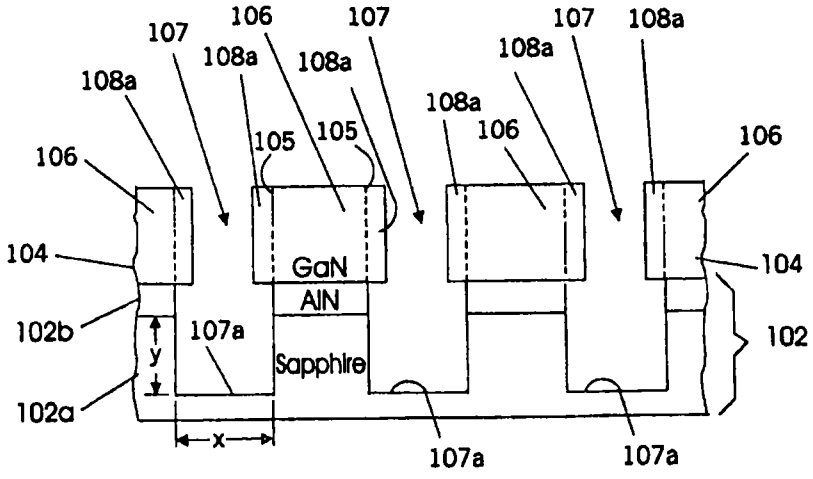
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PENDEOEPITAXIAL GROWTH OF GALLIUM NITRIDE LAYERS ON SAPPHIRE SUBSTRATES



(57) Abstract: Gallium nitride semiconductor layers may be fabricated by etching an underlying gallium nitride layer (104) on a sapphire substrate (102a), to define at least one post (106) in the underlying gallium nitride layer and at least one trench (107) in the underlying gallium nitride layer. The at least one post includes a gallium nitride top and a gallium nitride sidewall (105). The at least one trench includes a trench floor. The gallium nitride sidewalls are laterally grown into the at least one trench, to thereby form a gallium nitride semiconductor layer. In a preferred embodiment, the at least one trench extends into the sapphire substrate such that the at least one post further includes a sapphire sidewall an a sapphire floor. A mask (201) may be included on the sapphire floor and an alluminum nitride buffer layer (102b) also may be included between the sapphire substrate and the underlying gallium nitride layer. A mask (209) also may be included on the gallium nitride top. The mask on the floor and the mask on the top preferably comprise same material.

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