

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
23 September 2021 (23.09.2021)



(10) International Publication Number
WO 2021/188248 A1

(51) International Patent Classification:

H01L 27/11578 (2017.01) H01L 27/1157 (2017.01)
H01L 27/11575 (2017.01) H01L 27/11524 (2017.01)
H01L 27/11551 (2017.01) H01L 21/8234 (2006.01)
H01L 27/11548 (2017.01) G06F 13/00 (2006.01)

(21) International Application Number:

PCT/US2021/018567

(22) International Filing Date:

18 February 2021 (18.02.2021)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

16/821,818 17 March 2020 (17.03.2020) US

(71) Applicant: MICRON TECHNOLOGY, INC. [US/US];
8000 South Federal Way, Mailstop 1-507, Boise, Idaho
83707 (US).

(72) Inventors: LUO, Shuangqiang; 5620 S. Zonetailed Way,
Boise, Idaho 83716 (US). LOMELI, Nancy M.; 4074 W.
Quail Hill Court, Boise, Idaho 83703 (US).

(74) Agent: FLORES, Jesse M. et al.; TraskBritt, 230 South
500 East, Suite 300, Salt Lake City, Utah 84102 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN,
KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO,

(54) Title: MICROELECTRONIC DEVICES INCLUDING STADIUM STRUCTURES, AND RELATED MEMORY DEVICES
AND ELECTRONIC SYSTEMS

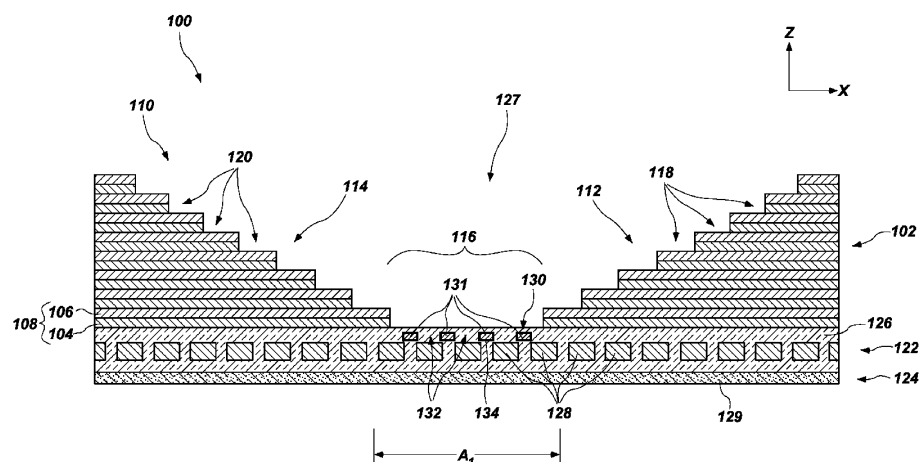


FIG. 1A

(57) Abstract: A microelectronic device comprises a stack structure, a stadium structure within the stack structure, a source tier underlying the stack structure, and a masking structure. The stack structure has tiers each comprising a conductive structure and an insulating structure. The stadium structure comprises a forward staircase structure, a reverse staircase structure, and a central region horizontally interposed between the forward staircase structure and the reverse staircase structure. The source tier comprises discrete conductive structures within horizontal boundaries of the central region of the stadium structure and horizontally separated from one another by dielectric material. The masking structure is confined within the horizontal boundaries of the central region of the stadium structure and is vertically interposed between the source tier and the stack structure. The masking structure comprises segments horizontally covering portions of the dielectric material horizontally interposed between the discrete conductive structures. Additional devices and

[Continued on next page]

WO 2021/188248 A1

NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW,
SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

- *with international search report (Art. 21(3))*