



(51) International Patent Classification:

H01L 21/336 (2006.01) *H01L 29/786* (2006.01)
G02F 1/1368 (2006.01) *H01L 51/50* (2006.01)

(21) International Application Number:

PCT/JP2014/078842

(22) International Filing Date:

23 October 2014 (23.10.2014)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2013-225182 30 October 2013 (30.10.2013) JP
2014-164080 12 August 2014 (12.08.2014) JP

(71) **Applicant** (for all designated States except US): **RICOH COMPANY, LTD.** [JP/JP]; 3-6, Nakamagome 1-chome, Ohta-ku, Tokyo, 1438555 (JP).

(72) **Inventors; and**

(71) **Applicants** (for US only): **SAOTOME, Ryoichi** [JP/JP]; c/o Ricoh Company, Ltd., 3-6, Nakamagome 1-chome, Ohta-ku, Tokyo, 1438555 (JP). **UEDA, Naoyuki** [JP/JP]; c/o Ricoh Company, Ltd., 3-6, Nakamagome 1-chome, Ohta-ku, Tokyo, 1438555 (JP). **NAKAMURA, Yuki** [JP/JP]; c/o Ricoh Company, Ltd., 3-6, Nakamagome 1-chome, Ohta-ku, Tokyo, 1438555 (JP). **ABE, Yukiko** [JP/JP]; c/o Ricoh Company, Ltd., 3-6, Nakamagome 1-chome, Ohta-ku, Tokyo, 1438555 (JP). **MATSUMOTO, Shinji** [JP/JP]; c/o Ricoh Company, Ltd., 3-6, Nakamagome 1-chome, Ohta-ku, Tokyo, 1438555 (JP). **SONE, Yuji** [JP/JP]; c/o Ricoh Company, Ltd., 3-6, Na-

kamagome 1-chome, Ohta-ku, Tokyo, 1438555 (JP). **ARAE, Sadanori** [JP/JP]; c/o Ricoh Company, Ltd., 3-6, Nakamagome 1-chome, Ohta-ku, Tokyo, 1438555 (JP).

(74) **Agent**: **HIROTA, Koichi**; HIROTA, NAGARE & ASSOCIATES, 4th Floor, TS Bldg., 1-24-10, Yoyogi, Shibuya-ku, Tokyo, 1510053 (JP).

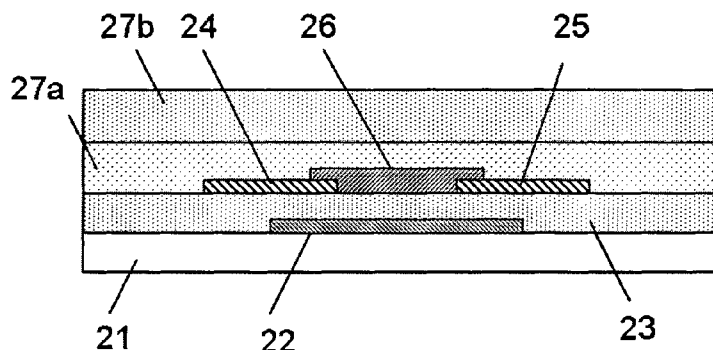
(81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, 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).

Published:

— with international search report (Art. 21(3))

(54) **Title**: FIELD-EFFECT TRANSISTOR, DISPLAY ELEMENT, IMAGE DISPLAY DEVICE, AND SYSTEM

FIG. 3A

(57) **Abstract**: A field-effect transistor, including: a base; a passivation layer; a gate insulating layer formed therebetween; a source electrode and a drain electrode, which are formed to be in contact with the gate insulating layer; a semiconductor layer, which is formed between at least the source electrode and the drain electrode, and is in contact with the gate insulating layer, the source electrode, and the drain electrode; and a gate electrode, which is in contact with the gate insulating layer, and faces the semiconductor layer via the gate insulating layer, wherein the passivation layer contains a first passivation layer, which contains a first composite metal oxide containing Si, and an alkaline earth metal, and a second passivation layer, which is formed to be in contact with the first passivation layer, and contains a second composite metal oxide containing an alkaline earth metal, and a rare-earth element.

