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2003-0039309
2003 05 17

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(22) 2002 11 09

(30) JP-P-2001-00345273 2001 11 09 (JP)

(71) 가 가
가 가 398

(72) 가 가 398가 가

(74)

:

(54) , , ,

가 가 가 , OLED 가
. , .
가 . , , .

2

, , , , , , ,

1

,

2

,

3

,

4(A) 4(B) ,
5 ,
6(A) 6(B) ,
7(A) ,
7(B) ,
8(A) 8(C) ,
9(A) 9(C) ,
10(A) 10(C) ,
11(A) 11(D) ,
12(A) 12(D) ,
13(A) 13(D) ,
14(A) 14(H) ,
15 ,
16 ,
17 ,
18(A) 18(B) TFT 3 (node) .

*

*

101: 102:
103: 104:
105: 200:
201: 202:
203:
204:

, OLED
가 . L = c(V)I(V) I(V) , c(V)

가 , OLED
가 . , 가

, OLED ,

AM OLED
가 . (TFT)

, , 가

, () , () ,

, () 가 ,

() 가

OLED ,

, .

가 가

, 가

, TFT , TFT 가

가 , (multi-drain)

3

, 가 , 3 ,

가 3 ,

, .

(, TFT)

(101) 가 (103) p 가 (102)
n 가 , ,
. .

3 (node) 가 , (101) 1 ,
(101) (Pj) , (102) (101) 1 ,
2 (Si), (103) , (102) 1 ,
(4(A)), (101) (201) .

(102) (103) (102) (102) (102)
, 1 , 2 (Vi), (101) 2 , (105)
. (102)

(105) , OLED , (105)
) OLED EL , . OLED , FED , OLED , (105)
. OLED 가

, OLED (105) , ,
. (102) (102) p n , ,
. (102) 가 , .

, , OLED (105)
, , (luminescence) 가 , () .
, () , .

(103) (Ej) (103)
(102) , (Vi) .

(104)가 2 (Vi) , (102) (102)
, (104)가 2 (102) (102)

Vi) () (Vi) () ()
() (105) 가

, OLED
. OLED

2 (201) 가 (狀) 1 200 , 203
2 가 , 204 202 , 203

1 (202), (203) ()
204)가 , (203) (202), (

(203) , (103)(1) (204) (201) (202),
(204) , (203)

(202), (203), (204)
TFT (203), (204) 가 (202),
) FPC (200) (200) (

1 (P1~Py), (200) (E1~Ey), (S1~Sx), (V1~Vx), (S1~Sx), (V1~Vx)
 가 (P1~Py), (E1~Ey)
 (V1~Vx) (V1~Vx)
 가 (Ta), 3 (Td), 4 (Te) (Tu)
 가 (ON) ON 가 (OFF) OFF
 3 (201) (Ta), (Td), (Te) (Tu) (Tu) (Te) (Tu)
) (Ta) (Te) (Td), (Tu) (Te) (Ta)
 가 (Tu) 4(B) (Td) 4(A) (201) (Ta) (Td) (201) (201) (Ta)
 가 가
 가 (Ta) (P1) (103) (101) (101)
 (102) (202) (S1~Sx) (201) (V1~Vx) 가 (101)
 (Ta) (201) 4(A) (101)가 (101)
 102) (P1) 1 (101) 가 1 (101)가 (101)
) n n (102) 1 가 (102) 1
 (102) 1 가 (Si) (201) (V1~Vx) (10)
 2) 1 (101), (102) 1 (104) (104)
 (102) 1 (101) (V_{GS}) (104)
 (102) 1 가
 (Ta) (102) 1 (W) V_{GS} (L) V_{TH} μ C_o (102) W/L
 (I_{dn})

$$I_{dn} = \mu C_o W/L (V_{GS} - V_{TH})^2 / 2$$

μ, Co, W/L, V_{TH} V_{GS} I_{dn} μ, V_{TH} 가
 (102) 1 (I_{dn}) (I_{vd}) I_{dn}
 μ, V_{TH} (102) 1

01) (Td) (Ta) (Td) (P1) (P1) (E1) (1)
 (103) (Td) (E1)

4(B) (Td) (201) (102) (102)
 (Ta) V_{GS} 가 (104) (Td)
 (101) 가 1 가 2

(102) 2
 (I_{vd})

$-V_{TH})^2/2$, $I_{dn} = \mu C_o W/L(V_{GS} - V_{TH})^2/2$, $I_{dn} = \mu C_o W/L(V_{GS} - V_{TH})^2/2$
 $I_{dn} = \mu C_o W/L(V_{GS} - V_{TH})^2/2$, $I_{dn} = \mu C_o W/L(V_{GS} - V_{TH})^2/2$
 $I_{dn} = \mu C_o W/L(V_{GS} - V_{TH})^2/2$, $I_{dn} = \mu C_o W/L(V_{GS} - V_{TH})^2/2$
 (I_{dn}) μ, V_{TH}

μ, V_{TH} (102) 1 2 (102)
 가 , 1 2 μ, V_{TH}

(Td) (102) 2 (I_{dn}) (I_{vd})
 (Vi) 가 (102) 2 가 (105) (105) (105) (105)
 (105) (I_{dn})가 (105)

(I_{vd}) (102) 가 (102) 가 (102) 가 (102) 가

1 2 (I_{el}) 1
 (I_{vd}) (I_{el}) (16)

(I_{el}) (I_{vd}) (I_{el}) 가

(Ta) , 2 (Ta) (P2) , 2 (E2)
 (103) (S1~Sx) (V1~Vx) 2 (202) (201)
 (102) 가 (101)

, 2 (Ta) (Td) (Td)
 1 가 , 2 (Ta) (I_{vd})가 , 3
 (105)가 (Ta)

가 3 (Td) 4 (Ta) ,
 , 4 (Ta) , y (Td) 5 (Ta)

1, 1
 1 (Td) (像) 60 Hz
 (103)가 가 (103)가
 가
 (204)
 1 (E1) (10 가
 3) (V1~Vx) (Te)가 (103) (102) (105) 가 (105)
 (105)
 (Te) (Te) 1 (Tu) 2 E2 2, 1
 (P2) (E2) 2 (101) (103)가 (定) (V1~Vx)
 (103) (102) 가 (105) (102)
 (105) 가
 (Te) 2 E2 3 E3 (Tu) y
 (103) (Tu) 1 (Ta), (Td), (Te)
 (Te) (Tu) 1 (Tu)
 (Te) (Tu)
 (Ta) (Td) (105) (I_{vd})
 (202) (201) OLED 가 가 (I_{vd}) OLED
 (L) L = c(V)I(V) (I_{vd}) (I_{vd}) n I(V)
 (I_{vd}) n
 2 OLED
 가 () , RGB (sub)
 2 (102) 가
 가

15

(17)

(202)(1)

2 가

(2)

1

가

(, (,) 가)

2

2

2

(

2000-3590

32

(Ta) 2 (Td) 2

가 , 1

, n

. n

(Ta1~Tan) n

, n

(Td1~Tdn) n

1

, n

n

1

TFT

2001-257163

(Tam)(m 1~n) (Tem)

(Tum)

(Tdm)

(Tem)

(T

um) (Tu) . m

(Ta),

(Tam),

(Td),

(Tdm)

(Te),

(Tu)(

(sub-frame) SFm

(Te),

(SF)

(SF1~SFn)

SF1:SF2:.....:SFn = 2⁰:2¹:.....:2ⁿ⁻¹

가

, 1

1

1

1

가

(1)

(201) 1 (202) (202)
 가 (I_{vd}) (S1~Sx)
 (302) 5
 (402) 6(A) 6(B)
 7(A) 7(B)

b), (B)(302c) (302) (V/C (302a), (302d) 가 (302) 5 (A)(302
 (SP) (302a) (CLK), (SP)가 (CLK)
 (402a)
 (A)(302b)

c) (A)(302b) 가 , V/C (302d) 가 (B)(302c) (B)(302
 가 가
 가 (가 100%) (가 0%) 가
 가

6(B) , 6(A) (402) 6(A)
 (402b), (402c), (402d) 가 (402) (402a),
 (SP) (402a) (CLK), (SP)가 (CLK)
 (402a)
 (402b) (402c)

(402c) (402c) V/C

6(B) , (402c), (402d) (402c)
 (410) (402b)

6(B) (402c) (411)가 (411)
 (406) (402d) (402c)가 (402d)
 (411) 6(B) (411) (402d)가
 (411) (411)

2) (402d)가 (412) 6(A) 6(B) (41
 (I_{vd}) 가 (402d)가 (417) (417) 2
 (413, 414) , (416) , (415) 가

(Res) (414) (Res) (413) (413) (414) (416)
 가 , (413)가 가 가 (414)
 가 , (415) 가 (415)
 가 0 가 가
 (歸線)
 가
 7(B) (203) (204) 7(A)
) 7(A) (203) (203) 가 (203)
 , (203a), (203b) 가 가
 , (203b)
 가 (203) 가 (203a) (CLK) (SP)
 , (203b)
 (101) (101) , 1
 (101) (203b)
) 7(B) (204) (204) 가 (204)
 , (204a), (204b) 가 가
 , (204b)
 P)가 (204) 가 (204a) (CLK) (S)
 , (204b)
 1 (103) (103) , 1
 (103) (204b)
 ()
 (203) (204)
 1 2
 (2)
 8(C) 8(A) 8(A) B-B' 8(B) 8(A) 8(A) A-A' 8(C)
 (503) 가 (501) , (501) (504) , (502) , (502)

가 (505, 506, 507) 가 (503) (504) , p , n
 (505, 506, 507) (504) (504)
 (504) 가 (LDD)
 가 ()
 (501) (505, 506, 507) (502) (508)
 (508) (502) 8(A) 8(C) (505, 506, 507)
 (509, 510, 511) , (502) (50)
 5, 506, 507) , (505, 506, 507)
 (502) ,
 8(A) 8(C) (503) 가 (509, 510,
 511)
 8(A) 8(C) 가 3 , (509, 510, 511)
 , 가
 , (511) , (503) (511) , (509) (510)
 가 (511) (509) (510)
 가 , 3 , 2
 , 18(A) 18(B) 가 ,
 가 가 가
 , 1 2, 1
 (3)
 2 2 ,
 3 가 ,
 9(A) 9(C) 9(A) 9(A) 9(C) 9(A)
 , 9(B) 9(A) A-A'
 B-B'
 (601) , (602) , (602)
 (603a, 603b, 603c) 가 (603a, 603b, 603c) (60)
 , (613) (601)
 4a, 604b, 604c) , 가 (605, 606, 607, 612) 가
 , p , n
 (603a) (604a) (602) (603b)
 (604c) (604b) (602) (603c)
 (602)
 (605, 606, 607) (604a, 604b, 604c) , (612)
 (604a, 604b, 604c) (605, 606) 2
 (604a, 604b)가 , (606, 607) 2 (604b, 604c)가
 , (607, 605) 2 (604c, 604a)가

가 (LDD)

가 ()

(601) (605, 606, 607) (602) (608)

(608) (602) 9(A) 9(C) (605, 606, 607) (605)

(609, 610, 611) (602) (605, 606, 607)

(602)

9(A) 9(C) (603a, 603b, 603c) 가

(609, 610, 611)

9(A) 9(C) 3 (609, 610, 611)

가 가 가 3 3

가 가 18(B) 9(A)

1 2, 1 2

(4)

19(B) 10(A) 10(A) A-A' 10(C) 10(C) 10(A) 10(A) B-B'

(702) 가 (701) (703) 가 (701) (703) (702) (704) (704)

(702) (705, 706, 707) 가 708 (701) (704)

(705, 706, 707) (704)

(704) (LDD)

가 ()

(703) (705, 706, 707) (708) (708)

(705, 706, 707)

10(A) 10(C) (701) 가 (709, 710, 711) (709, 710, 711)

10(A) 10(C) 3 (709, 710, 711)

가 가

2

1 2, 1 3

(5)

11(A) 11(D) 12(A) 12(D)

(102) 2 (103) (101)

OLED

11(A) #7059 #1737
(5001)

(下地膜)(5002) CVD SiH₄, NH₃, N₂O
(5002a) 10~200 nm(50~100 nm) 가 SiH₄
(5002b) 50~200 nm(100~150 nm)
(5002) 2 2

, N₂O

(5005, 5006) (5005, 5006) 25~80 nm(30~
60 nm) (SiGe)

YAG

, YVO₄ 가
cm² (200~300 mJ/cm²) , YAG 300 Hz 100~400 mJ/
30~300 kHz , 300~600 mJ/cm² (2
mJ/cm²) , 100~1000 μm, , 400 μm 350~500
() 50~90%

, Ar , Kr , YAG , YVO₄ , YLF , YAIO₃
Cr, Nd, Er, Ho, Ce, Co, Ti Tm , Ti:
가 YAG, YVO₄ , YLF, YAIO₃
, 1 μm

2 2 ~ 4 가
VO₄ (532 nm) 3 (355 nm) , Nd:YVO₄ (1064 nm) Y
10 W YVO₄

cm² (0.1~10 MW/cm²)가 , 10~2000 cm/s 0.01~100 MW/

VD (5005, 5006) 40~150 nm (5007) (5007) C

120 nm (5007)

40 Pa, 300 400 CVD TEOS(Tetraethyl Orthosilicate) 0.5 0.8 W/cm²
 (13.56 MHz) 400 500

00 nm (5007) 1 (5008) Ta 50~100 nm 1 (5008) 2 (5009) W 100~3

Ta Ta Ar (相) Ta Xe Kr 가 , Ar 20 μ cm
 Ta Ta Ta Ta 가 180 μ cm 10~50 nm

W W 6 (WF₆)
 CVD 가 W 20 μ cm W 가 가 가 (氣相)
) 99.9999% W 99.99% W 9~20 μ cm

a, W, Ti, Mo, Al, Cu 1 (5008) Ta, 2 (5009) W , T

9) W 1 (5008) 1 (5008) 1 (TaN) 2 (TaN) 2 (5009) Al 2 (5009) Cu
 1 (5008) (TaN) 2 (5009) Cu

(5010) ICP(Inductively Coupled Plasma:) 1 가 CF₄ Cl₂
 1 Pa () 100 W 500 W RF(13.56 MHz) RF(13.56 MHz) Ta
 가 . CF₄ Cl₂ W Ta

1 2 가 15 45° 가
 , 10~20% 가
 . W 2~4(3) ,

20~50 nm 1 (5013, 5014)(1 (5013a, 5014a) 2 (5013b, 5014b))
 (5007) 1 (5013, 5014) 20~50 nm

1 n 가 1 × 10¹³ 5 × 10¹⁴ /cm² , 가
 60 100 keV . n 15
 , (P) (As) 가 , (P) . (5013, 5014) n
 (5017, 5018) 1 × 10²⁰ ~ 1 × 10²¹ /cm³ n (5017, 5018) . 1

가 .(11(B))

11(C) 2 가
 CF₄ Cl₂ O₂ W 2 2 가
 (5028, 5029)(1 (5028a, 5029a) 2 (5028b, 5029b)) . 2 (5007)
 2 (5028, 5029) 20~50 nm

W Ta CF₄ Cl₂ 가 (種)
 , W Ta WF₆ , W
 WCl₅ , TaF₅ , TaCl₅ 가 , CF₄ Cl₂ O₂ 가 CO F가 , T
 Ta , O₂ 가 , CF₄ O₂ 가 , O₂ 가 ,
 F F가 F , Ta W , Ta ,
 a F가 Ta , W Ta , W Ta
 , 11(D) , 2 , 1 , 가 70~120 k
 eV , 1 x 10¹³ /cm² , 11(B) 1
 , 2 (5028, 5029)
 3 , 1 (5028a, 5029a) 가 가 ,
 28a, 5029a) (5034, 5035) 3 (5034, 5035) 가 (P) 1 (50
 가 (5028a, 5029a) 가 (5028a, 5029a)
 가 ,
 , 12(A) , 3 가 CHF₆
 (RIE) , 3 (5028a, 5029a)
 (1 (5039a, 5040a) 2 (5039b, 5040b)) 3 (5039, 5040)
 (5039, 5040) 20~50 nm (5007) 3
 3 , 3 (5034, 5035) 1 (5039a, 5040a) 3
 (5034a, 5035a) , 1 3 (5034b, 5035b)
 , 12(B) , p TFT (5005) 1
 4 (5049~5054) , 3 (5040b)
 (5200) , n TFT (5006)
 (B₂H₆) , 가 2 x 10²⁰ ~ 2 x 10²¹
 21 /cm² 가
 (5039, 5040) 3
 (5200) , 가
 (RTA) , 가 1 ppm , 0.1 ppm
 4 가 400~700 , 3 500 600 (5039, 5040) 가 500
 ())
 , , 0.01~100 MW/cm² (가 0.01~10 MW/cm²
) 가
 , 3~100% 300~450 1~12 가 ,
 ()
 , 12(C) , 1 (5055) 100~200 nm

1 (5055), 2 (5056), (5062), (5055), 2 (5056), (5062), (5057), (5064), 2 (5056), (5059~5062), 1 (5059~5062)

2 (5056), BCB() , 2 (5056) 가 , TFT 1~5 μm(2~4 μm) , n (5017) p (5049, 5054)

Ti 150 nm () (5059~5062) 3 Ti 100 nm, Ti 300 nm, (5064) (ZnO) (5062) (5064) ITO 110 nm (5064) 2~20% (12(A))

12(D) (5064) () 500 nm (5065) 3 가 가 가

(5066) (MgAg) (5067) (5066) 80~200 nm(100~120 nm), (5067) 180~300 nm(200~250 nm)

RGB 3 (: CCM) () RGB (5066) 4 (5067) (5067) MgAg (5066) (5068) 300 nm (5068)

12(D) 가

가 . , , Ni TFT 가 가 .
 10 MHz
 CMOS n TFT , , TFT
 , n TFT , , LDD (L_{ov}), LDD (L_o
 FF)
 , CMOS p TFT , n TFT 가 LDD LDD
 가 .
 , CMOS 가 LDD , CMOS n TFT
 가 CMOS 가 , CMOS n TFT L_{ov} 가
 , 12(D) ,) (材) () 가 가
 , , ()
 , 가 (FPC) 가
 , , ,
 가 .
 1 2, 1 4 .

(6)

OLED , OLED 13(A) 13(C)
 13(A) 가 , 13(C) 13(A) B-B' , 13(B)
) 13(A) A-A'
 (4001) (4002), (4003), (4
 004a, 4004b) (4009)가 , (4002), (4003),
 (4004a, 4004b) (4008)가 , (4
 002), (4003), (4004a, 4004b) (4001),
 (4009), (4008) . 4210 ,
 , (4001) (4002), (4003),
 (4004a, 4004b) TFT 가 , 13(B) (4010)
 (4003) TFT, , TFT(4201)(n TFT p TFT 1

) (4002) (4202) .
 , TFT(4201) p TFT n TFT가 ,
 (103)(13) n TFT가 .
 TFT(4201) (4202) () (4031) , (42 (42
 02) nction)가 () (4203) . (4203) , (work fu
 , , , , 가
 , (4203) (4302) , (4302) (4203)
 . (4203) (4204) . (4204) (4204)
 , 가 . , 가
 (4204) , , , . , .
 가 가 .
 (4204) () (4205) , , (4205) (420
 4) 가 , (cluster tool)) (4205) (4204) (420
 . 가 . () ,
 , () (4203), (4204) (4205) (4303)가
 (4303) , (4303) (4302) (4209) . (4209)
 4005a (4005a) (4009) (4001) , (4202) (4300) FPC(4006)
 FPC (4301) .
 (4008) , , () , FVP() , ()) (MyI
 ar) , , , (FRP) , FVP(, (foil) PVF)
 , , , . , .
 , (4103) , , , , PVB() EVA
 (, PVC()) , , , , .
 , (4103) () ,
 (4008) (4001) (4007) , (420 (420
 7) . , (4207) (4007) , (420
 8) (4207) (4007) . , (4207)
 (4208) (4207)
 (4303) .
 13(C) , (4203) , (4005a) (4
 230a) .

(8)

OLED

가

(), (DVD) () ()

14(A) 14(H)

14(A) (2001), (2002), (2003), (2004), (2005) 가 , T V ,

14(B) (2101), (2102), (2103), (2104), (2105), (2106) (2102)

14(C) (2201), (2202), (2203), (2204), (2205), (2206) (2203)

14(D) (2301), (2302), (2303), (2304), (2305) (2302)

14(E) (DVD) (2401), (2402), A(2403), B(2404), (DVD) (2405), (2406), (2407) A(2403), B(2404) , 가

14(F) () (2501), (2502), (2503) (2502)

14(G) (2601), (2602), (2603), (2604), (2605), (2606), (2607), (2608), (2609) (2602)

14(H) (2701), (2702), (2703), (2704), (2705), (2706), (2707), (2708) (2703) (2703)

가

가 , 가 가 CATV() 가 ,

(非)

5.

, ,
3 가 ,

3

6.

5 , 가 3 , 3 1

7.

5 , 가 , 3 3 1

8.

$n(n-2)$,
 n $n+1$ 가 ,
 n n
 $n+1$ n n

9.

8 , 가 $n+1$, $n+1$ 1

10.

8 , 가 $n+1$, $n+1$ 1

11.

, ,
3 가 ,

3

12.

11 , 가 3 , 3 1

11 13. , 3 1
가 , 3

14.

15.

14 16. , , 가

14 17. , , 가

14 18. , , 가

14 19. 가 , 가, OLED , ,

20. 가 가 ,
가 ,

가

20 21. , , 가

20 22. , , 가

가

가

33.

32

34.

32

35.

32

36.

가

가

가

37.

가

가

가

38.

37

39.

37

40.

37

41.

가

가

가

가

가

42.

가

가

가

3

3

43.

42

가

44.

42

가

45.

42

가

46.

42

가

가, OLED

47.

가

가

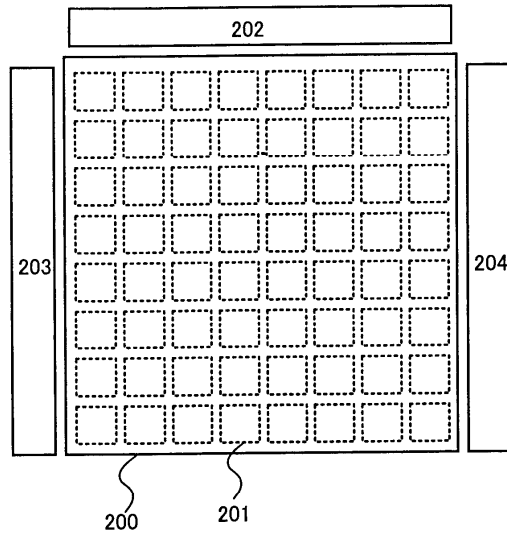
가

3

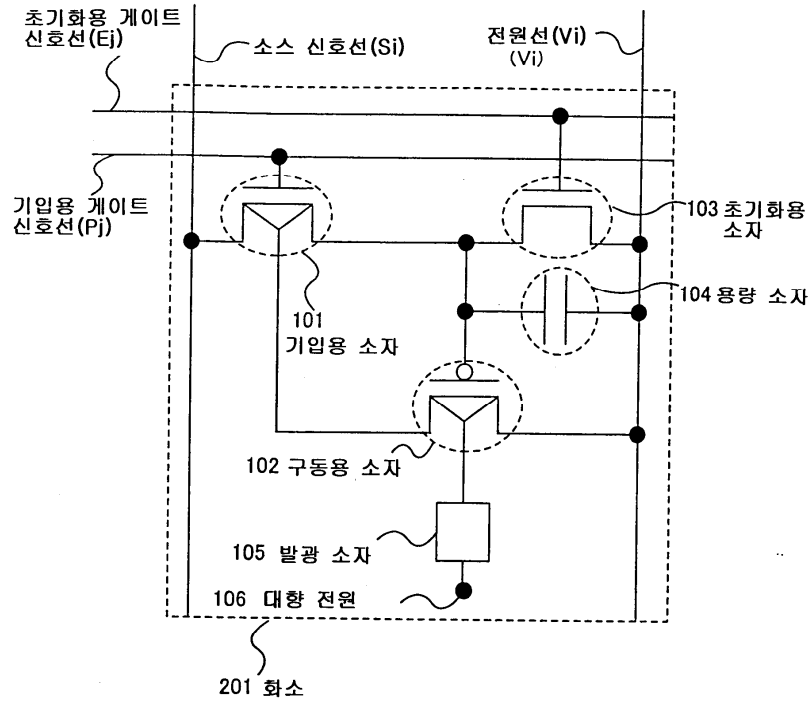
3

가

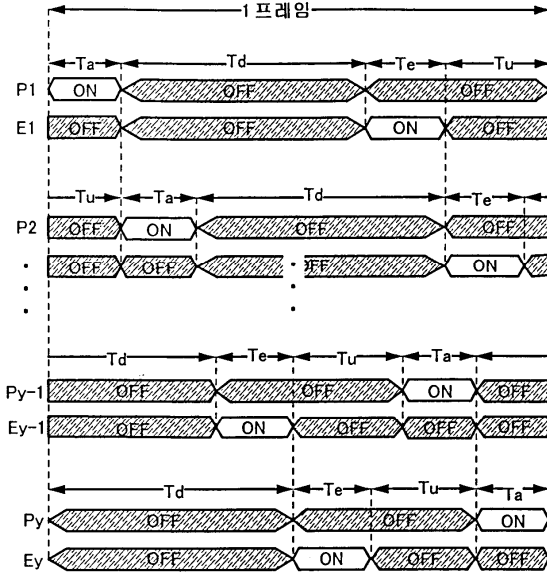
1



2

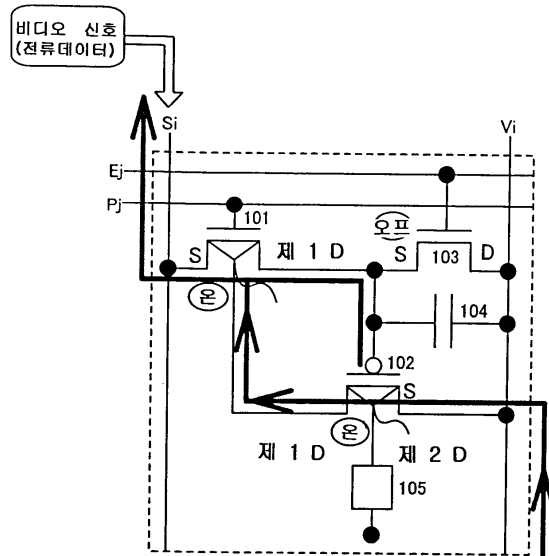


3

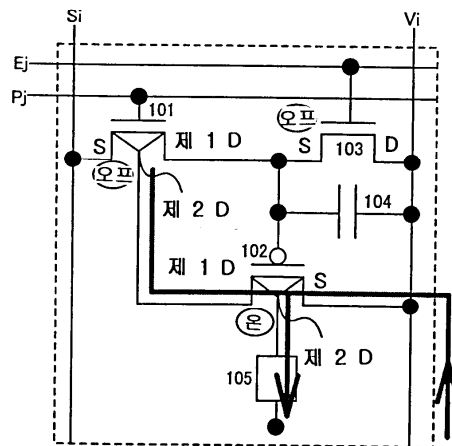


4

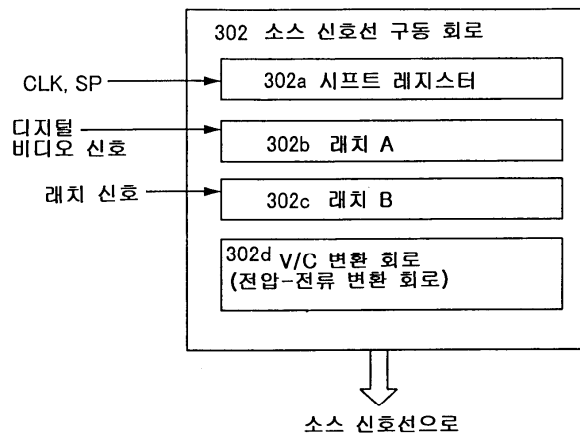
A 기입 기간 T_a



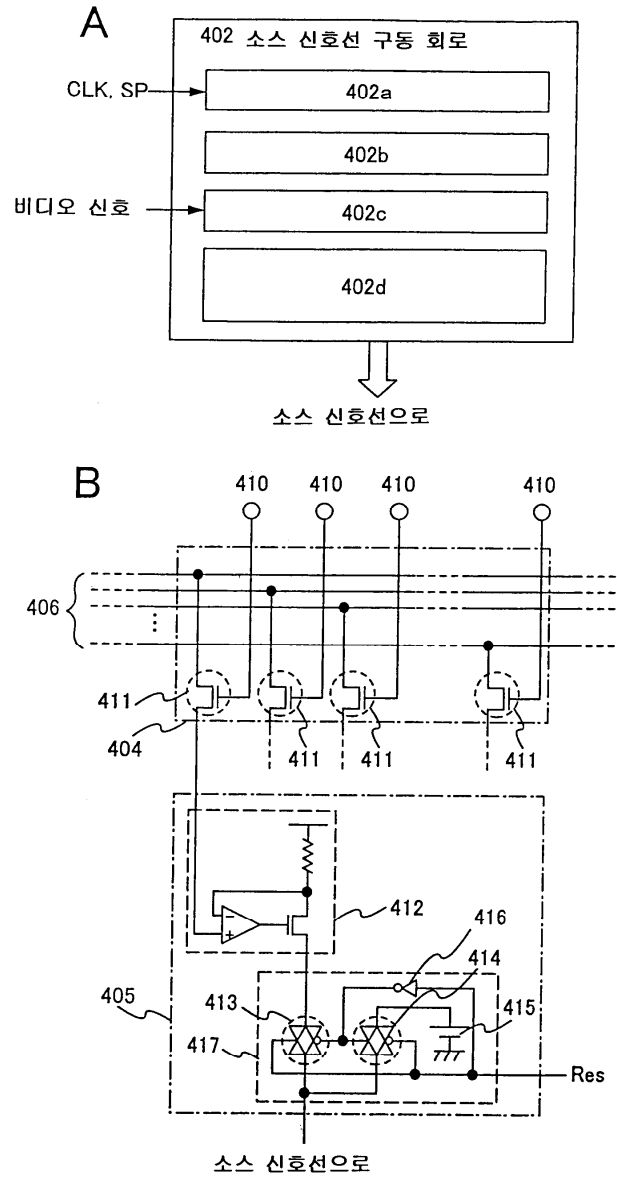
B 표시 기간 T_d



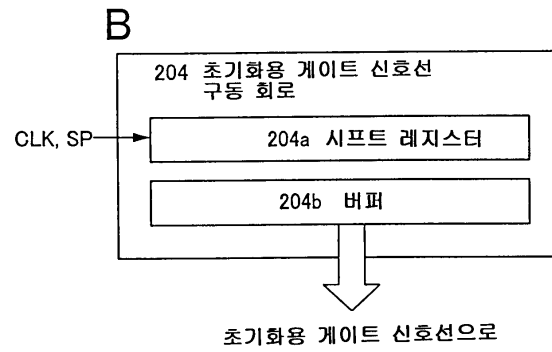
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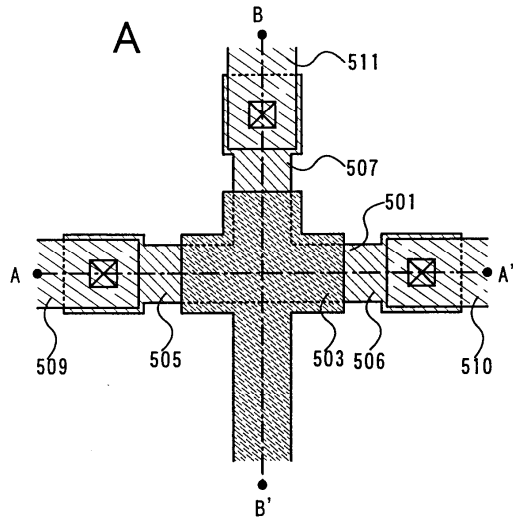
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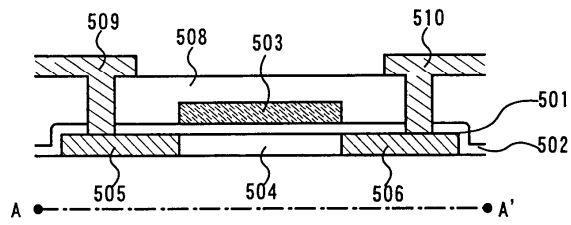
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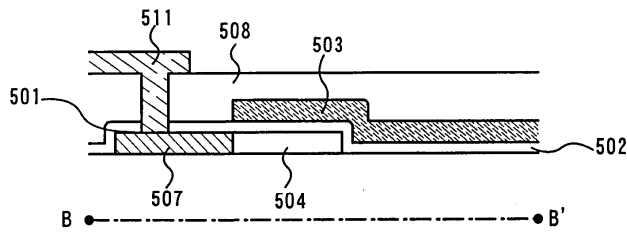
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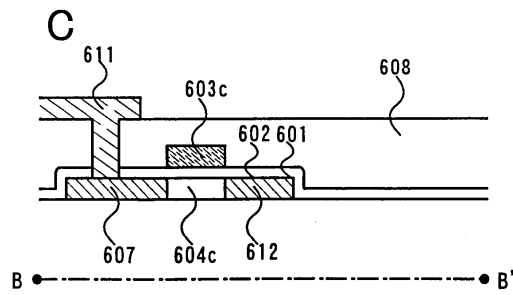
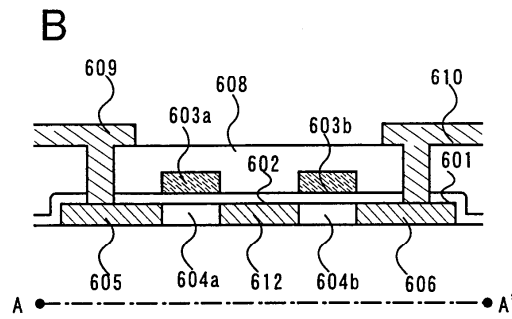
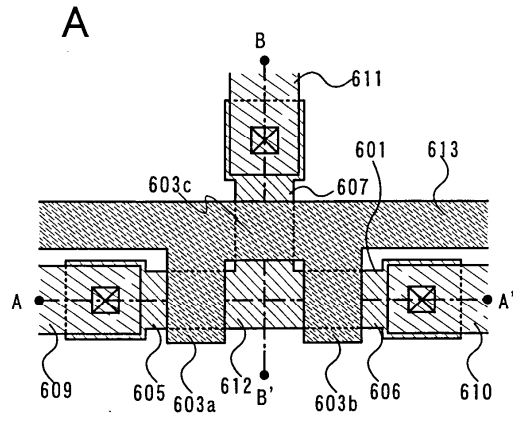
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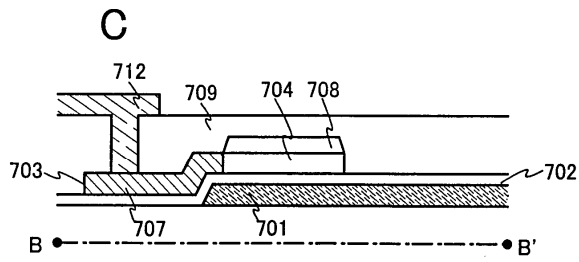
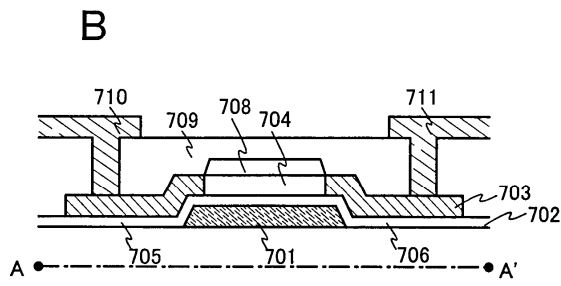
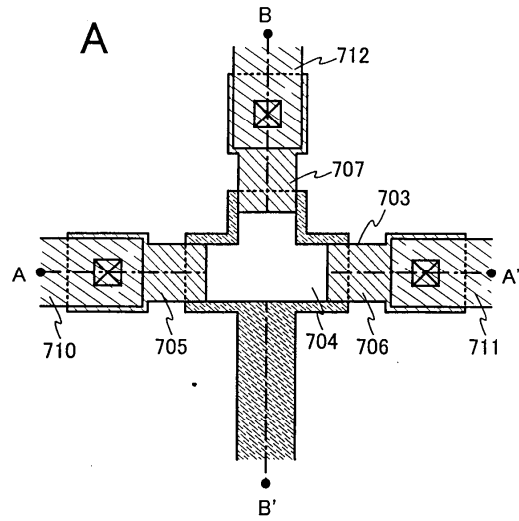
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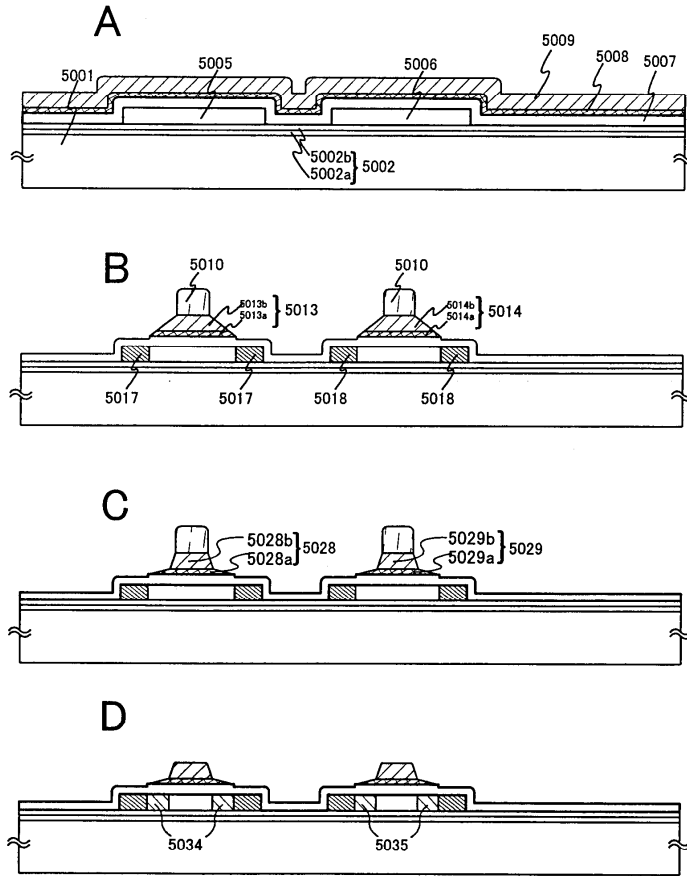
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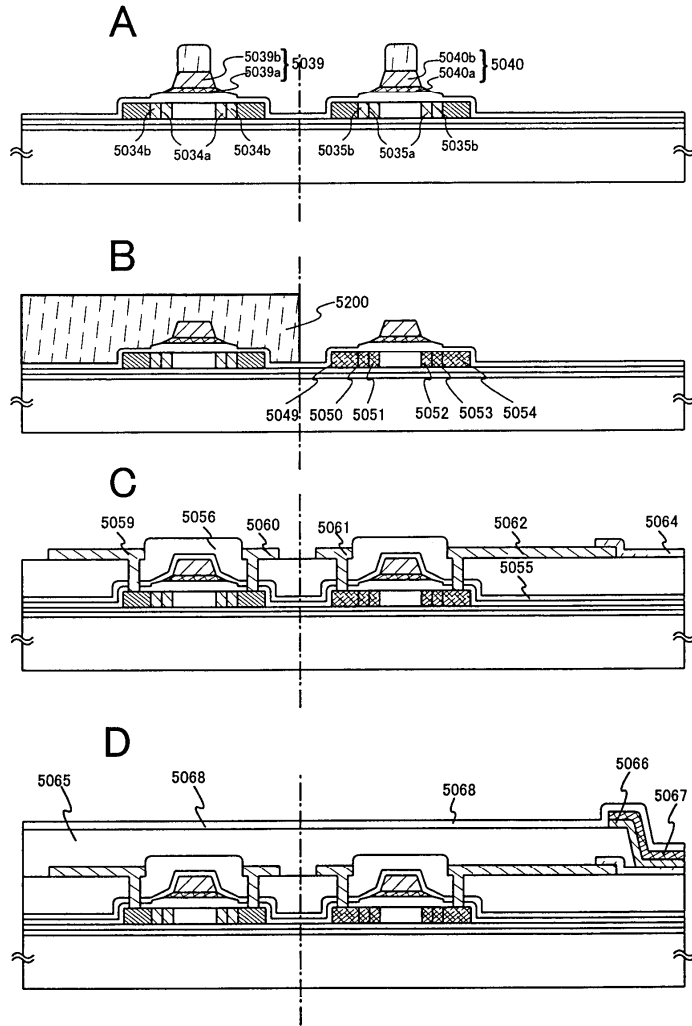
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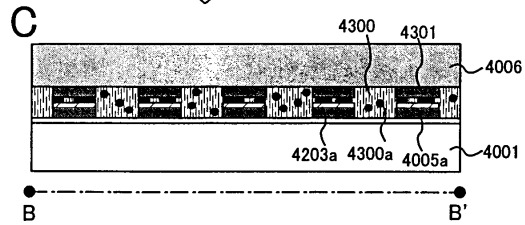
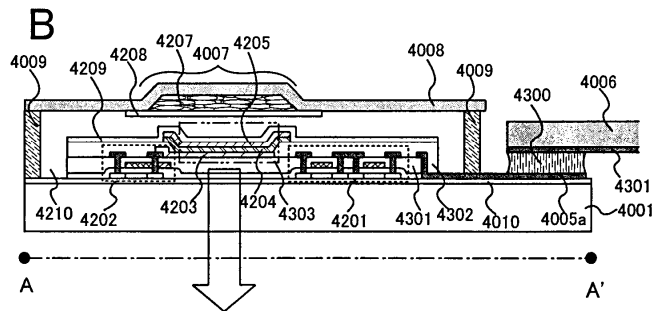
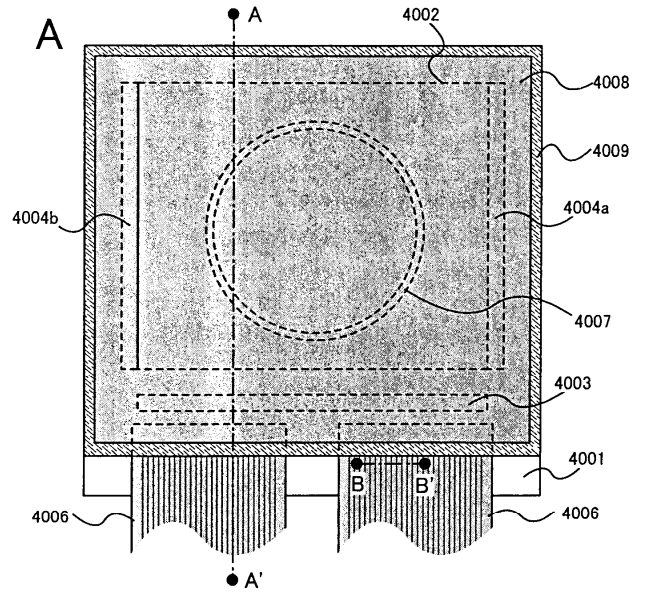
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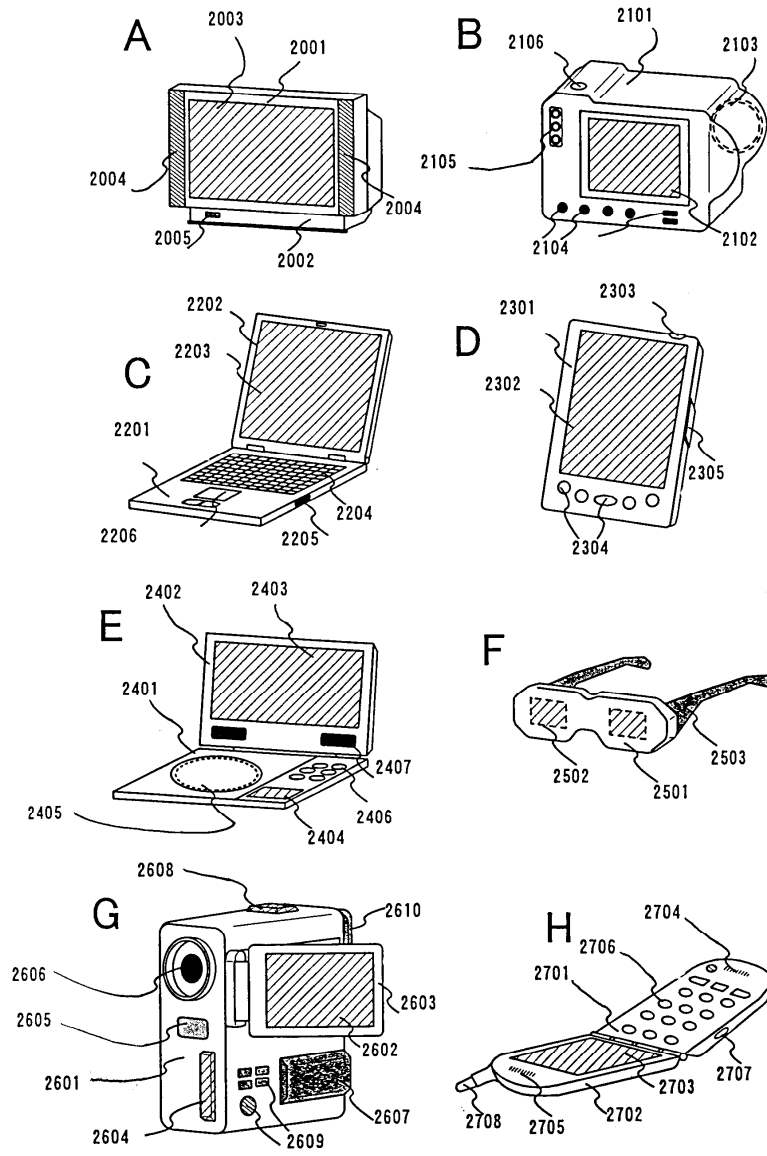


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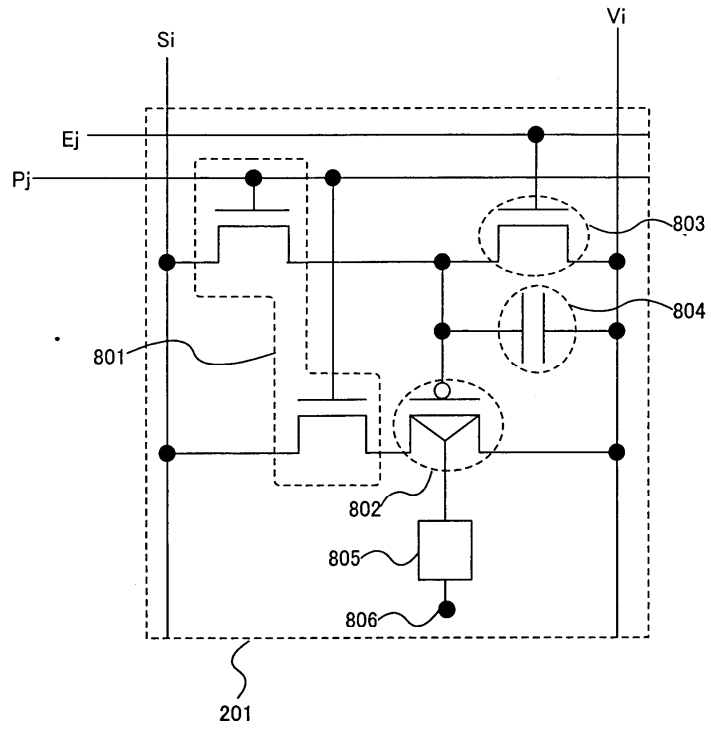


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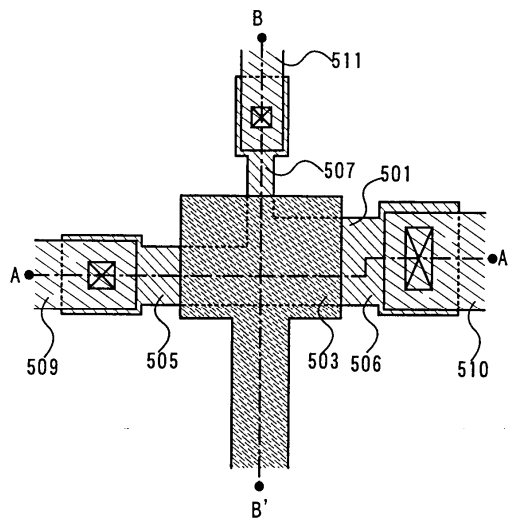




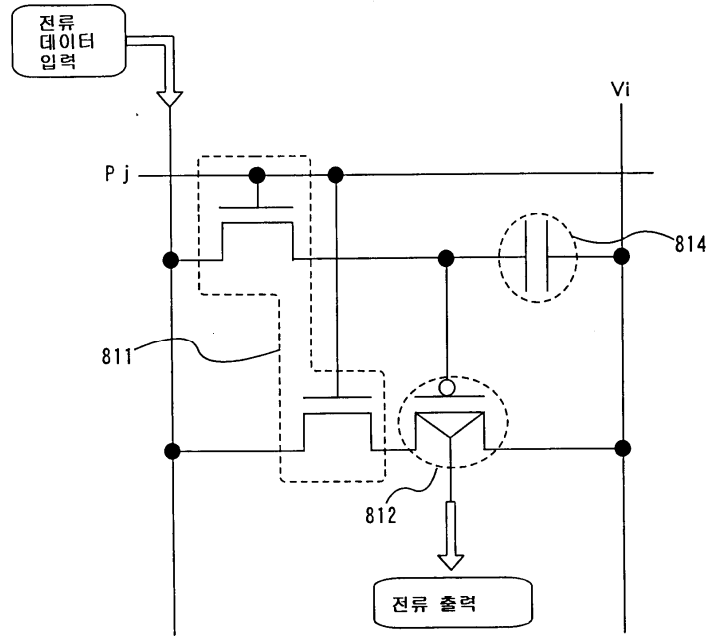
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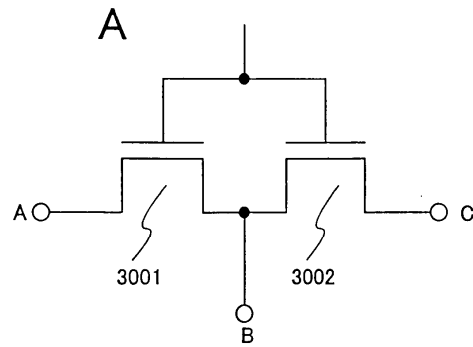
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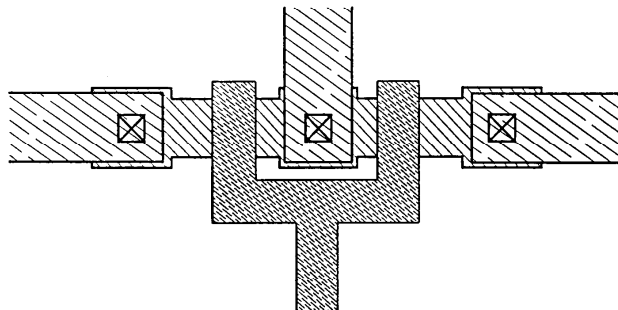
17



18



B



종래 기술

专利名称(译)	半导体器件，电路，显示器件，发光器件和电子器件		
公开(公告)号	KR1020030039309A	公开(公告)日	2003-05-17
申请号	KR1020020069401	申请日	2002-11-09
[标]申请(专利权)人(译)	株式会社半导体能源研究所		
申请(专利权)人(译)	株式会社绒布器肯kyusyo极限戴哦		
[标]发明人	INUKAI KAZUTAKA 이누카이카즈타카		
发明人	이누카이카즈타카		
IPC分类号	H01L51/50 G09F9/30 H01L21/336 H01L21/77 H01L21/8238 H01L21/84 H01L27/08 H01L27/092 H01L27/12 H01L27/32 H01L29/423 H01L29/49 H01L29/78 H01L29/786 H04N5/66		
CPC分类号	H01L27/1214 H01L27/1222 H01L27/1251 H01L27/3244 H01L29/42384 H01L29/4908 H01L29/66757 H01L29/78621 H01L29/78645 H01L29/78696 H01L2029/7863 H01L27/3262 H01L29/42312		
代理人(译)	黄的.		
优先权	2001345273 2001-11-09 JP		
其他公开文献	KR100950031B1		
外部链接	Espacenet		

摘要(译)

本发明实现了一种电流存储电路，该电流存储电路可以做得尺寸小，元件数量少，可以简化配置，可以低功耗工作，并且可以提高制造产量。此外，通过将该电流存储电路应用于诸如OLED显示装置的电流驱动型显示装置，可以提高显示装置的像素开口率，可以实现高可靠性，并且可以实现高性能。本发明的特征在于使用具有与具有多个漏极或源极的晶体管相同形状的新型半导体元件。当该半导体器件用于写入器件和驱动器件时，电流值，存储器和电流输出的写入只能由这两个半导体器件进行，因此，可以极大地方便小面积。2 指数方面 半导体器件，显示器件，发光器件，电子器件，写入器件，初始化器件，驱动器件

