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G09G 3/30
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571-0807 가 1011-1-345
571-0074 가 16-1

(74)

(54) E L

가
N=10 , 10 , EL 가 EL (15) , EL (15) 10 , (15)
, EL (1F) 1/10

(EL) EL

, EL

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, (EL) 가

EL , EL 가

EL () 가

EL 가

가 가

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EL 62 (16) 8-234683 EL (15), 1 (11a), 2

(11b) (19) (15) (11a) (11) (11) (EL)

62 , EL (15) (11b) ()

62 EL (15) OLED() 가

62 OLED15

(15) OLED (15) 가

가 EL 가

가 (15) EL EL

62 , P (11a) (S) Vdd() , EL (15) (, P

) (Vk) () (11b) (D) (18)

(11a) (17a) (G)

(19) (11a) (11a) P , FET, MOSFET

(71) N (11)

(16) 가 (17a) (11a)가 (19) (18)

(11b) (17a) ()

11a)가 , (11b) (18) , (11a) EL (15) (11a)
 ((11a)) (19) / Vgs , EL (15) (11a)
)
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1 1 가 가 ,

2 2 가 가 ,

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EL , 1 1 , 1 2 1

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, 8 , I(I 2) , J(J 2) ,

가 ,

가 ,

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EL 가 ,

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EL , 가

, 9 , ,

가 ,

1 I , 7

EL .

, 10 P 7

EL .

, 11 EL ,

EL ,

EL 1 ,

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1 P ,

N
 N
 EL
 , 12 , EL EL
 1 1 1/N(N 1) , EL EL
 , 13 , 1/N , 12
 EL
 , 14 , EL EL
 EL , 1/N(N>1)
 1/N EL
 , 15 EL , EL 1 1
 EL EL
 EL
 , (11a) , 2 (IC)(14) () , 1 (16)
 (11a) 2 (11a) (11a) EL (15) (11a)
 (11a) EL (15) EL (15) (11a)
 (11d)
 , (11a)
 , (14) 1 μ A , 2
 , 1/2=0.5 μ A 가
 , -1 가
 (14)가 (18)
 (16) (14) (16) (14) (11a)
 , EL (15) (14) (11a)
 (11a) (14)
 (11a)
 (16)
 EL (15) , CRT , (11d)
 5) , EL (15) , 10 , N=10 , 10 가 EL (1
 , EL 가

1 (1F) 1/10 . , N ,
 , 1F/N , EL (15) (1F(N-1)/N)
 1F ()가 .

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11 : ()

12 : IC()

14 : IC()

15 : EL()()

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18 :

19 : (가 , 가)

50 :

51 : ()

52 : (,)

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61 :

62 :

63 :

71 : ()

72 : ()

73 :

74 : ()

81 : IC()

82 : IC()

83 :

84 :

85 :

86 :

87 : (Vdd)

88 :

89 :

101 : ()

102 :

104 :

105 :

106 :

107 :

108 : $\lambda / 4$

109 :

111 :

281 : ()

341 :

371 : OR

401 :

471 :

472 :

561 :

562 : SD(-)

571 :

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573 :

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991 :

992 : PC(,)

993 : (, , A/D)

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1063 : ()

1111 :

1381 :

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1471 :

1472 :

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1511 :

1512 :

1841, 1842, 1843 : ()

1851 : ()

1854 : (1 :)

1853 :

1861 : ()

1891 :

가

(582) (59) (58)
 4, 15, 18, 21, 23, 27, 31, 35, 39, 44, 52, 53, 55,
 63, 67, 77, 78, 79, 80, 114, 116, 120, 122, 125, 129, 130, 131, 132,
 133, 136, 139, 140, 144, 145, 152 164

(11), (11)
 (TFD),

FET, MOS-FET, MOS

PLZT

(11), (11)

EL

EL 10

(105) (71)()

1 EL (15) () (106) () (106) 가 EL
)(105) () () (106) () 가 EL
 (15)가

(8 (86), (87)) 가

가 40 100(A) 가

() 가 (E

L

(106)

Al-Li

가 (105) , ITO

가

, ITO IZO

(105) 가

EL (15))

EL (15) ,

EL

EL

(85)

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(107)

EL (15))

. EL (15))

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EL (15))

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)(111)

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DLC()

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, 10%

가

(111)

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(111)

DLC

(106)

(111)

$n \cdot d(n$

(

$n \cdot d$

)가, EL

(15)

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2

, EL (15)

(71) (85) (111) 10 10)」
 , EL , EL 가
 10 μ m 가 2 μ m 6 μ m 가 1 μ m
 (74) EL 가
 (111) , DLC(), ()가
 EL (15) 11 ()가 Ag-Mg 11 20 300
 , EL (15) , EL (15) , ITO
 (111)
 EL (15) (106) (71)
 , (106) 가
 (71) $\lambda/4$ (108) () (109)
 ()
 , 가 EL (15) (108)
 (109) (105) , (105) , EL (15)
 (105) () (106)(105)가 가
 , 30% 가 가
 (BM)) , 가
 가
 (24) 가
 (105) (ITO) (105) , EL (15)) (106)
 (105) EL (15) 가 가 EL (15)가
 , 가 가 EL (15) 가 (105) (11),
 (17) ()
 EL (15) EL
 , 68 (681)
 (681) (105) (681)
 (105) EL (15) (106) EL (15) 68
 (681)
 71 (105) (681)
 , 72 (721) (681)
 SiO₂ , SiO, TiO₂, Al₂O₃
 (681) EL (15) , EL (15)) 가
 EL (15)
 , 73 , RGB EL (15) RG

B, 73 RGB () ,

(71) () , 69
 , EL (15) ,
 (71) ,

69 (a) (691) (105) (105) 가
 (105) (105)

1μm 210μm
 2μm 20μm
 , 2μm 10μm
 , 3μm 10μm
 () (2) 3

69 (b) (691) (106) (106) 가
 (106) (106)

70 (691) (106) (691a, 691b) 2 (6
) , (691a) (691b) 3
 91a), (691b) 3

(11) LDD() EL
 EL (OEL, PEL, PLED, OLED) (15)
 , EL

EL

1.

2. 1 EL

2가

2가 , 62 EL (11a) EL (EL 1)5 , 1 (11b)
 , 2

(11a)

가 , (11a) 가

() ,
 , 가 가 450
 , ±0.2V 0.5V , (11a)
 , 가
 , (11)

가 450 ()
 , (CGS)

62 , 가

8) EL (11) EL , 1 가 4 (105) (18) 1 (HA)

1 4 (11) (11a) (11b) (11b) (11c) (11c) (11d) (17a) (11c) (18) (11d) (17b) (11d) EL (15)

(11b 11c) 2 (11d) 1

(1)(17a) (가) EL (15) (11a) (11c)가 (11a) (11b)가 (11a) (가 , 가)(19) (14)가 (3 (a)).

(17a) (OFF 가), (17b) 가 (11a) EL (15) (11d) EL (15) (3 (b)).

1 (19) Cs(pF) , 1 가 () Sp(μm) , $500/\text{Sp} \leq \text{Cs} \leq 20000/\text{Sp}$, $1000/\text{Sp} \leq \text{Cs} \leq 10000/\text{Sp}$ Cs , ()(19)

(19) EL(15) EL (15) EL (15)(15R, 15G, 15B)가 10 μ () (19)

1 P . P N EL P 가 , . N . N P

1 (11c, 11b) , N (11a, 11d) P P N EL (15) 가 (11a) P 가 .

(11) P , (12) P 가 5 , P

1 87, 88 . 8 lw (18) 가 . 8 (1) lw (11a) lw lw가 , (11a) lw Vt (G) lw Vdd Vt2

가 (88). V_{dd} (16) V_{t1} (11a) 가 (88). V_t (11a) I_w (18) , ,

(11a) (16) (11a) 가 (18) (11a)가 가 , (11a) (11a) (16) (18) 가 ,

(12) , 1 (17a) 가 , 1 , (17a) (17a) 가 , (18) I_w (17a) V_t (16) (11a) , I_w

(17b) 가 , 가 (11d) (11a) EL (15) , EL (15)가

(17a) , 1 (1H) 가 , 89 (18) 가 (88) . 1H , 1H , 1H , 1H , ()

1 , 1H , (,) , (18) (16) μA (16) mA (50) (18) , (50) 1/2

90 (997) , (18) I_w 가 (18) I_w (996) (991) (991) V_d 가 (995) + () (995) (994) R_m

I_w 1 μA (10 μA) , 100nA , (991)가 V_a , (995) + 가 , + - (18) , I_w 가 (994) (18) $I_w = V_a / R_m$, I_w

(18) (18) I_w (18) (997) (996) , (997) , ACF

(18) 가 , (18) (18) I_w () , (18) 가 , 2 (18) , EL (15) 1 , (18) 가 ()

90 () , (18) I_w 가 , (17a) 가 , 89 ()

, AD() (993) ()
 , (PC)992 .
 (18) 가 , 가 (18)
 () () , FET (18)
 + (18) (997) (993) ()
) + .
 QCIF , 176×RGB=528 (18) (18) AD
 (992)) . 90 , AD (PC
 (993) , AD (993) .
 91 (18) () () 91 (17b)
 a) 1H (18) () . 91 (b)
) , 1 가 (11a)가 , (18) (91 (a))가 .
 91 (c) (992) ((993)
) . (992) 가 .
 PC(992) 가/ . , ,
 , , , .
 87 , Vdd → (17a) 가 , (17b) 가
 (11a) SD → (11c)→ (18) 가 .
 (11a) S- D (SD)가 ,
 (18) Vdd (92 (a) SD) . (11a) SD ()
 , (17a) , lw , (18)
 가 가 (92 (b)) . , (17a) (1
 8) () .
 , (17a) 가 , (18)
 , (16) (11c) 가 , (11b)
 , Vdd Vdd () 가 , Vdd ,
 (18) 가 (16) , (18) 가 ,
 (16) .
 , (18) 가 , (16)
 , .
 (12) , (1 가 (1
 8) ((71)) (50) . (1 가)
 93 (a) , 1 ((18) (16)) (18)
 Vtmin (16) Vtmax((16) (11a) Vt(88)) ,
 가 (11a) Vt(88) .
 , Vt , 93 (b) , Vt (11a)
 , Vt , Vt ,
 ,

(18) (12) (17a) 가
(18) (16)
(18) Vt
(16) 92 (SD) (16)
(18) 가
(17a) (18) 가
(18b) (18) (18a) (996) (997)
(18a) (996) (997) (18b)
, 4
, 90 (12) (COG)
(17) IC(12)
90 (997) (18) 가 IC(14) (18)
가 IC(14) (71) (993)
, 87 (38)
(71) (16) (17a) EL 가
(11a)가 (18) () () 가 가
(18) (17a) (18) 가
(14) (71) EL (15) () 가
, 2 1 EL 3 EL
(11b) (11c)가 ON 1 가 3 (a) (11a)
lw가 (11c) lw가 (11a) - l1
, 2 3 (b) (11a) (11c)가 (11d)가
(11a) (11a) lw
, 5 (a) (51a) (50)
() () () (51a) 5 (b)
() () () (53) (53)
EL (15) 가 , EL (15)가 .
1 , 3 (a) lw가 (18)

) , lw가 (11a) , lw 가 , (19) (
) , (11d) () .
 , EL (15) 3 (b) , (11c, 11b)가 ,
 (11d)가 , (17a) (Vgh) 가 (11b, 11c)가 ,
 , (17b) (Vgl) 가 , (11d)가 .
 4 , 4 , (, (1))
 (17a)(1) , (1) (17a) , 4
 H(「」 , 가 ,) , (1H , 1H
 , 1H 1 , , (1H , 1H
 ,) .
 4 , (, 1H) , (17a)
 가 , (17b) 가 , EL (15) 가
 () . 가 , EL (15) 가 () .
 (17b) 가 , EL (15) 가 () .
 , (11a) (11c) (11a)
 , (11a) (11c) (11c) (17) (32
) . 1 (17a, 17b, 17c) (1 ON/OFF (17a,
 17b) 2) . (11b) ON/OFF EL (15) (11c) ON/OFF .
 , (11a)
 P) (17a) (17b) , (11c 11d)가 (N
 , .
 가 가 가 (11a) (S)- (G) 가 (
) , 가 (11c) (11d) , (11d)가
 가 (11c)가 , (11d)가
 , 1 , (17a) (12a)(2
) , (17b) (12b)(1
) , (17a, 17b)
 (12) .
 , 가 가 ,
 4 가 , 가 ,
 (11e) 2 , 가 4
 (11e) 가 , (11c)
 EL (15) .
 2 , (11e) 가 , (11e)
 (11e) , (11a) EL (15) , (11
 a) 가 (11f) 가) , (11f) 가 (12) , (
 12) 가 , (17f) 가 (12) , (
 , (17f) 가 .
 , (17a), (17b), (1f)
 , 2 (12) , 1 가
 .
 , 1, 2 , 63 , 63 1
 1d) (11a) EL (15) (631)가 , 1 (1
 (,) .

(11d) , (11d) 63 .

63 , (631) a , Vdd , a 가 , EL (15) .

(631) b , (63 , EL (15)) , b 가 .

(631) c EL (15) 가 , (631) EL (15) , 63 , EL (15) 가 , EL (15) .

EL (15) 가 . EL (15) 가 .

(631) , P , N , P 2 N , (631) EL (15) .

(631)가 a , EL (15) EL (15) Vdd 가 , EL (11a) G가 .

(15) (631)가 b , EL (15) EL (15) GND 가 , EL (15) (11a) G .

d)가 63 , (631) (11a) EL (15) (11a) EL (15) .

1, 2 , (11a) 1 , 64 (11a1, 11a2) 63 1, 2 (11a1, 11a2)가 , 2 (11a) , 1 가 .

1, 2 (11a)가 EL (15) , (11a) EL (15) (11d) , 65 .

65 , EL (15) 가 (11a) . EL (15) Vdd EL (15) (11d) , (11d) , EL (15) .

(11a) (11a) 가 $5\mu\text{m}$ $100\mu\text{m}$, 1 (11a) 가 $10\mu\text{m}$ $(50)\mu\text{m}$ 가 , L , 가 .

, (11)가, () .

, (14) . (14) (11a) , (14) .

4

가

(19) Cs, 2 (11b) loff

$3 < Cs/loff < 24$

6 < Cs/loff < 18

(11b) 5pA, EL (2%) 가 1

(19) 2%

가 p-ch (11b)가

(11b) (19)

(11b) (11a) - ON/OFF

가 ON/OFF 가

(16) (11)

(11) (11) 1 (16) 가 EL (1

5)

(CGS) (11)

7 (72) (72) (18)

1 72 RGB 1 (16) (72) 1 3

).

(,)

RGB 3 , R, G, B

(72) , 1 (11)

Vt, S) (, (18) (11) 가 ,

(11)

(72) 10 (72) 가 (,

(50) (72) (72))

[illegible]

EL (溫特) . 가 ,

(18) (14) (18) (COG) (71)

가

(14) COG (COF) IC IC(82) IC(

14) , 3

(12) (14) 가 ,

(12) , COG (71)

()

(12) (17a) (61a) , (17b) (CLKxP, CL

(61b) (STx) (61) (相) (ENABL) ,

KxN), (UPDWM) 가 , 가

IC(81)

(61) (17) (17) 63 2 ,

(62)가 (61) (17)

(14) (71) 가 ,

(18) 가 (14) (

() ,

6 (14) (18) , ,

가

(62) P MOS N MOS (62)가 ,

(12) (61) (62) P N

(63)

(61b) (12) (61a) 62 (17a) (63)가 ,

(17b) (71)

74 , (17a) (341a) , (17b) (17b)

(341b) , (17a) , 가

111 (12) CMOS , 6 , (1, 2) N

P 111

(12) , P (17) . 111 , (1111)가 , 4

111 (12)(12a, 12b) , 4 (SCK0, SCK1, SCK2, SCK3) , ((SSTA)), 2 (DIR A, DIRB, (Vd) , 가) L (VBB) , H

111 (12) , P () , (8 (IC)(82) .

(16) P (12) . P , 111 P (11b, 11c), (11d)) L 113 , L . L . P , H

L , EL (15) (1 (11a)) P , E (15) , (16) P (16) Vdd EL (12) (5) P) P , (12) P (

(LS) , (71) , (LS) N P , P (12) 가 (12) , (71) , P

(1 , (11c)) P , 1 (12) P , (16) , 1 , (11b), 38, 50 , 62 2 (, 4 (11c), (11a)) , 51 (11a)) (12) , 111, 113

111, 113 (12) , (16) P (, P , EL () , (DIRA, DIRB) (1111) , 가 가 , 113 가 (DIRA, DIRB) (DIRA, DIRB) 가 , 111 . 4 , 4 가 , 4

(SCK0, SCK1, SCK2, SCK3) , (1111) (1111a) , SCK0가 OC , SCK2가 RST (1111c) 가 (1111a) (1111b)() , SCK1 OC , SCK3 RST , SC (1111) , SCK0 OC , SCK2가 RST , SCK0 K1 OC , SCK3 RST (1111) , SCK0

OC.에, SCK2가 RST

113 (1111) P 1
14가 113 , 112 113
113 가 , 114 ,

P (17) H (113 V
d) 가 , L (113 VBB)
, , n1 , n2 n1 , IN , RST SCK
SCK , n4 n4 , Q , OC , L
(1111) (17)). SQ Q ,

111, 113 , IN(INA, INB) , 가 , 165
(a) , 1 (17) , 165 (b) 2
(17) (a) , 1 (51a) () , (12a)
165 (b) 2 () 24 1 (51a, 51b
) () 1 , 2

165 (b) (51a) (51b)
, (16)가 , 가 , 2

, 165 (b) , 123
, 113 4 , 4 , 1 ,
2 (SCK) 4 (S
CK) 8 , 8 , 113 , 168

168 (a) , 4 1 (4 ,
, IN (4 , 2 , 168 (b) , 4 , IN
, 1 , 1/2) (, 4 , 4/2=2)

1 165 (a) , 167 (a) lw (16)
lw 167 (b) , 2 , lw (16)
2 (16a, 16b) , 167 (b) lw×2 가 ,

(12a) , 165 165 (a) , 1
, 1 1 , 165 (b) , 2
, 1

168 EL (15) (17b) (12b)
(17b) 168 (a) 4 (,) 1
, 4 가 (53) , (HD) 1
(17b) 1 가 (3 가(4
(17b) 가) , 4
가) ,

168 (b) 4 (HD) 2 1 (17b) , 4 가 2 (53)
(17b) 가(2 가(4 (17b) 가) , 4
, , , ,
, 168 (a) 4 1 (17b) 가 168 (b) ,
4 2 , 6 (17b) 1 가 , ()
2 (17b) 가 , 168 . 8
, RGB
169 168 (a) , (17b) (17b) , (1)
, (17b) () , ,
169 , (17b)(1) (17b)(4) , (17b)(5)
(17b)(8) , 4
170 168 (b) , (17b) 120
, (17b)(1) (17b)(4) , (17b)(5) (17b)(8)
, 4
168 , , (50)
. QCIF , 220 , 168 (a) , 220/4=55
, 55 가
55 → 54 → 53 → 52 → 51 → 5 → 4 → 3 → 2 → 1 → 0 ,
, 0 → 1 → 2 → 3 → 4 → 5 → 50 → 51 → 52 → 53 → 54 → 55
, ,
가 , , 가,
가 (,).
, (50) , 1
. 54 → 52 → 50 → 48 → 46 → 6 → 4 → 2 → 0 , 5
5 → 50 → 45 → 40 → 35 → 15 → 10 → 5 → 0
가 , 168 (b) , QCIF , 220/2=110
, 110 가 110 → 108 → 106 → 104
→ 102 → 10 → 8 → 6 → 4 → 2 → 0 , 0
→ 2 → 4 → 6 → 8 → 10 100 → 102 → 104 → 106 → 108 → 110
, ,
, (50) , 2
. 4 , 4 , ,
, 가 (1 ,
), 1 , 1
(, 1H 1/8 , 1H 15/16)
() (MCLK) . QCIF , MCLK 2.5MHz ,
1 (17b) (1H) 176 , MCLK EL (15)
(Vgl) 가
, 112, 114 , (SCK) L , L

. SCK가 L , Q 가 L (Vgl)

168 (a) , 171 , 1H Vgl()
 . 171 (a)가 1H 가 Vgl() (, 113 P
 (12) , 1H L 가 . 1H
 1H Vgh () . 1721 (a)

가 , 171 (b) , (17b) Vgl , MCLK가 2 ((
 a)) , 171 (c) , (17b) Vgl
 , MCLK가 2 ((b)) , 가 .

168 (b) , 172 , 2H Vgl()
 . 172 (a) 1H 가 Vgl() (, 113 P
 (12) , 2H L 가 . 2H
 2H Vgh () . 171 가 .

가 , 172 (b) , (17b) Vgl , 2H MCLK가 2
 ((a)) , 172 (c) , (17b) Vgl
 , MCLK가 2 ((b)) , 가 .

, (12) , 173 , 171
 (17b) 가 2H .

168 , 13 (53) ,
 (52) , 168 (53) . 4 1 ,
 가(168 (a)) , 4 2 가(168 (b))
 . , 113, 111 , (SCK)
 , 1 , 6 ,
 (53) , P () ,

174 , (12)가 113 P ,
 , 가 . () , CRT
 () , ()
 () ()가 () 4msec
 가 , 1 (1) 1/4 () , 1 (1
) 1/2 () .

, , ,
 , , ()
 , () . , ,

174 (a) , A , 4 1 () , 4 (4
 H) 1 (4H 1H). (, ,
) , 4 msec , 가). 124 (a) B (,
 , , 4 msec , 8 msec () .

, A B ,
 174 , A (174 (a) 175) . CRT
 . , (174 (a) 175 . 175 (a)→(b)→(c)→(a) (

) . 174 (b) 176 . 176 (a)→(b)→(c)→(a) ()).

, 8 msec) , 4H , 1H , 174 (a) , 1 (1) 4 msec((()) 가 , , A (A B) , , B (B) ((50)) . 174 (b) 가 .

174 (b) , 2 , 2 , A (A) , 2H , 2H . B (B) , B , 가 . 174 (b) , A ,

(1 , (1) 1/4 , () , 4 msec (1) ()가 (1 (1) 1/4) , , 4 msec 2 (1 (1) ((12)) .

174 53 , (50) () (168 , (174 B) , B (53) ((50)) , QCIF 가 220 , 220 10 55 , 220/ 220/44=4 , 4 1 . 10=22 1 .

, 174 B (B) 1 , 2 () .

, 174 (a) , 4 1 , 22 (, 20 1 가 , 4 5 =20 1 , 1 ()) . 20 , 4 (220-4×5=200) , 174 (b) , ()

, 174 , 4 msec 가 (()) . 가 (, 1 , 가 (53) 가 , 1 lw .

(ID) , , 174 가 () , 168 (, 168 AV , 174 , 168 (12b) SSTA

1 EL (15)

174 168 (,
) , 가
 가
 ()

177 174 (a) (17b) 가 (Vgh가 , Vgl (17b)) 1 (11d) , EL
 (15) L(QCIF , L=220) 1 , 168, 174
 1 (38)

l) 177 가 . B (A) , 4H 1H (Vgh) 가 (17b) EL (15) (Vh
 가
 ,
 , 1
 , 1
 , 1
 , 2
 () . 2
 , 1
 , 174

2 1 가 CRT
 , 4 =1 1 (4N+1) (, N)
 2 (4N+2) 3 (4N+3)
 4 (4N+4)
 , 2 =1
 =1

177, 178 , 171, 172, 173 1 (1H)
 , EL (15) () , (50)

178 177 가 , 174 (b) (17b) 가 177
 A (A , 168 (b)) (17b) , 2 (2H) ,
 (Vgl) 가 , (Vgh) 가
 . B (B) 가 (17b) 가
 1H

177 174 (a) (17b) 가 (Vgh가 , Vgl (17b)) 1 (11d) , EL
 (15) L(QCIF , L=220) 1 , 168, 174
 1 (38, 43, 51, 62, 63)

178 177 가 , 174 (b) (17b) 가 177
 A (A , 168 (b)) (17b) , 2 (2H) ,
 (Vgl) 가 , (Vgh) 가
 . B (B) 가 (17b) 가
 , 1H , 177() 가
 , (50) , A B

, A B (, A). , 1 (1
, () , A B , 124 .
179 , 179 , 4 ((a), (b), (c), (d))
179 (c) 3 , 179 (d) 4 =1 , 179 (a) 1 , 179 (b) 2
→..... 179 (a)→(b)→(c)→(d)→(a)→(b)
1 , 179 (a) , , 1
(b) , 179 (b) , (50) (179
, (50) , 179 (c) ,
4 (50) , (50) , () (179 (d)
).
, 179 , (a), (c) , , ()
(15) , 179 (a), (c) , (17b) , EL
179 (b) , (, 1H) , 179 (a)
(가 (12b) 가 (179 (a) , 179 (b), (d)
, 179 (a) , (17b)
(19) 179 (a), (c) (, 1
179 (a), (b), (c), (d) , 11
.
, 179 (b), (d) 4 msec , , (17b) , 179
(a), (c) (12b) , (17b)(17b)()
, 가 , 가 , 179 (c) 가
, 가 , 가 , 179 (a)
, d) 가 가 . 129 (a), (b), (c), (d) , 4 msec(179 (b), (d))
,
179 , 가 (179 (a), (c)) (, 179 (b), (d))가
) .
179 , 1 3 , 2
(179 (b), (d)) 1 3 , 2
, 168
2 , 180 (c) 180 (a) 1 , 180 (b)
, 4 , 4 180 (b) 가
3 =1 2
, 180 (a)→(b)→(c)→(a)→.....
180 (a) , 168 (a) 4 (4H) 1H , ((17b) 4H
1H , Vgl () 가 . 가 2 , (17b) (Vgh)
가 , 180 (b) , 1 .

, 4 msec , 180 (a)가 (179)
 (17b) , ,
 180 , 4H 1H , , () , ,
 , (, 1 , 1) , () .
 181 (17b)(1) 1H, 5H, 6H, 9H, 1
 3H, 14H, 가 . 가 (,)
 가 (17b) 가 가 (17b) ()
) ((17b) 가 , ()
 181 , (17b) 가 , 1H , ,
 , (17b) 1H() (가)
 , 181 (Vgl) 가 ,
 () .
 , () , (17b) , 가
 , , 2 =1 () () ()
 (17b) , 2 1 2 가 10H
 , 가 , 2 20H , 가 (2 가
 , 10H+20H , 가). , 30H , 가
 .
) , 4 182 (4H) 182 (a)(1) , 182 (b)(2) (17b)
 , (4+4)H (1+2)H (17) , 4H 2H 가 , 가 , 2
) (가 (17b) 가 , (132 2
 (가).
 , 180 4H 1H 가 , , ,
 183 (17b) 가 , 8H 1H 가 가 , , ()
) 가 , (17b) .
 , (17b) 가
 , (50) , (50) , 1 (50a) 2 (50b) , (50a 50b)
 가 , 2 (50) , lw () 2
 (50b) () , 1 (50a)
 , 4H 1H , (17b) 가 , 2 (50b) , 8H 1H
 , (17b) 가 , 가
 , , ,
 (IC)(82)(8) , (12) (17) ()
 (16) , IC() (82)가 , (16))
 , IC() (82)가 , .
 IC(82) (LS) , ()
 (12) , IC(82) ,
 (12) () (14) ,
 (14) (가 가).

, (71) P
 (12) 111, 113 P , CMOS
 (12) (12) , 6 μ m , 600 μ m . 2.2 QCIF
 (12) , 1.2mm 700 μ m . 가 CMOS(N P ,
) , (16) P , P (1 (11b, 11c), (11d)) L
 (Vgl) . P (12) L . P
 113 , L . L
 , H (Vgh) .
 , EL (15) (1 (11a)) P , E
 L (15) 가 . , Vdd EL (12)
 15) P (16) P (16) (12)
 P (11a), (11d, 11b, 11c)) P , (12)
 P
 (LS) (71) . , (LS) N P , P
 . () , (71)
 (12) 가 . (12)
 , (71) COG . , (14) ,
 (71) COG . (14)
 (11a) P , (71) (16) (16)
 (14) , N 가 가
 (14) lw 가 .
 (16) (11a)(1)가 P
 (14) lw , (14) (, ,)
 N () P () (14) 가 (71) , N
 (12) P () , (16)
 () .
 8 , (14a) (,) (84) IC(81)
 8 (12) 가 IC (14) , (14) , IC(81)
 , 3.3(V) (12) 가 (14) 4 8(V) , IC(81)
 , (12)가 5(V) .
 (12)
 (14)
 , 8 (14) , , (,
), , 8 , , 9 , 3 ,
 ,
 (12) , 9 , 1 () IC() (14), IC()
 (, 1

IC(12)가 (12) , Y IC(14)가 (14) . (50) X IC(12) , IC(14) (14) (71) . (12) , (71) . (14) , 3 IC(12) (71) IC(TCP, TAB) (71) 1 (1) IC(14), IC(12) IC가 , 9 (12) (14) 가 , (17) c 가 . (17) , b (17) (17) , a (17) C (17) $5\mu\text{m}$ $12\mu\text{m}$ $5\mu\text{m}$ $5\mu\text{m}$ 가 $7\mu\text{m}$, $12\mu\text{m}$ D가 , (17) , (17) (17) (17) 9 c (17) ITO , ITO , ITO ITO 가 , 9 (17) (17a) (50) () , (17b) (50) () IC(14) IC(12) 1 , 1 IC , IC 1 EL (15) (11a) Vdd , 0.01(A) B EL (B) EL , B G, R 5(V) , (G) (R) 9(V) (SD) 가 , (SD) 가 , R, G, B R, G, B , Vdd () Vdd R, G, B EL (15) , R, G, B EL , 10(V) , 2. 5(V) 가 , R EL (15) 7(V) , G B

EL (15) , 7-2.5(V)() 7+2.5(V)()
1.5(V) 가 .

R, G, B 3 , R, G, B, 3
, B 2 , R, G, B, 6
, R, G, B, 5 가 ,
, R, G, B, 4 () , R, G, B, 7
B (50) () , RGB 3 , 1
EL , RGB 3

EL 3가 ,
, RGB 가 , RGB EL 가
EL EL

, 3 () . 1 RGB 3 R, G, B (16)
가 ,

RGB 3 1 , 가 ,
가 () ,
가 7000K() 12000K
가 $\pm 30\%$ $\pm 15\%$ 가 1
00A/ , 3 85 A/ 70A/ 115A/ 130A/

EL(15)
() 가 가 (

(11) (12)((14)) , 50nm
150nm 가 가 (11
A1)

20 100nm
(19) ,
(19) (HA)

(12) , (12)
(71)

(12) 가 EL EL EL 가
(12) 1 EL EL
EL

(11)가 (11) () , EL (15)가 ,
(16)가 (19) (11a) ,
(19) ,
(19) ,
(16) (11) IC(14) 56
(11a) - (SD) (562)가 Vdd IC(14)가
IC(14) Vdd()
IC (561)
56 (11a) SD (562)가 , EL (15)가 , EL
(15)가 ()
(11a) - (SD)가 (11a) (G) 56 , Vd
d EL (15)가 ((11d)가). ,
(11a) SD가 , (11c)가 , Vdd (18
)가 (14) Vdd가 , (14) Vdd ,
(14)가가
(11a) SD , , (11a) EL (15)가
(11a) , (S) (D) , (11a)
, 1 , (11a) Vdd가, (11a) (G) (11a) (G
)가 , (19) 2 , Vdd , EL (15) ,
(19)
Vdd , Vdd
()
(16) , EL (15) EL 15
, EL (15) (,).
EL (15)가 , , EL (15))
, 1 , 62,
51 ,
, 1 (, 1 (11)가 p (17a)
) (17b)
(18) () (18) (17)
(11b, 11c)
(18) t C, V,

17가 $t=C \cdot V/I$ 10 (18) 10 가

IC(14) 10 (16) 가 10 (17d)

EL (15) 10 1 10 1 (18) (14) (16) (11a)

5) 10 (18) 10 가 EL (15) EL (15) 1/10 (15)

10 (18) (11a)(19) 10 (11a) 1/10 EL (15) 1/5 10 (11a) EL (15) 1/2

1/10(11d) 1 1/10 (11d)가)

EL (15) 1/N EL (15) (11) N1

1/(N2) (N1 N2)

1/1(가) 1 2

(2H) 가

R 가 1 1/3 () RGB G B 가 1 1/4 R, G, B

() ()

1/N 1F(1 1) 1F 1/N (1H))

N N=3.5

N=10 (16) 1/5 EL (15) EL (1

5) 10/5=2 (15) N=2 (16) 1/4 EL

(15) EL (15) 2/4=0.5 (1/1, (1 1) 1 (16) EL

() EL CRT 가 EL 1F(1 1) 가

()

, $1F/N$, EL (15) , $(1F(N-1)/N)$.

$1F$ () , () 가
 () , CRT 가 , 가
 , ()
 가 , IC(14)
 (18) 가 , ()
 가 ,

1, 2, 38 EL (19)
 EL (15) , (19)

(11d), (11e) EL (15)
 , EL (15) (19)가
 (11d) lw () ,
 EL (15) 가 ,
 () , EL ()

N , (17b)(11d) 10 $1F/N$.
 (18) , IC() (14) (18) (17)
 (18) IC(14) $10pF$ (18) 가 ,
 20nA (19)
 , 1 (, 1H ,
 1H , 1H , 가)
 1 lw가 3 (a) lw가 (18)
) (11a) (, lw) 가 , (19) ()
 (11d) ()
 , EL (15) 3 (b) (11c, 11b)가
 (11d)가 , (17a) (Vgh) 가 , (11b, 11c)가
 (17b) (Vgl) 가 , (11d)가
 , 11 () N , 3 (b) EL (15) lw
 , 10 B EL (15) , 12 , N
 , 1/N ,
 (11d) ($1F$) $1/N$, $(N-1)/N$

$1F$, CRT
 가 $1/N(1)$ (CRT
 1 (1)).
 $1F/N$ (53) 13 (b) (50)
 $1F/N$, EL (15) 가 , $(1F \cdot (N-1)/N)$
 13 (51a) (52a) , 1, 2
 38 (51a)
 16 , lw , 1 , 13,
 N
 $1F$ ()가 ()가 EL () , $1F$,
 가 () , 가 () ,
 () . , CRT 가
 14 , 가 1
 38 , 63 , 64 , 65 , 1
 14 가 , $1H$ () , (17a) ((
 Vgl) 가 (14 (a)) , (17b) (Vgh) 가 (14
 (b)) . , EL (15) 가 () .
 , (17a) (Vgh) 가 , (17b) (Vgl) 가
 N (N · B) , EL (15) , (N · B)
 $\times (1/N)=B()$, $1F/N$, $1F$
 $1/10$, 가 , $1/10$ 가
 15 14 () , (17a, 17b)
 $Vgh(H)$, $Vgl(L)$. (1)(2)
 15 , (17a)(1) (Vgl) , 11a (
 14) (18) 가 , 가 , lw (16)
 (16) (11a)가 P (16) (11a)가 N ,
 lw (16) (16) (16)
 N (, $N=10$, (16)
) , 10 가 (11a)
) 가 , EL (1) (15) 가 , 1 (17b)(1) (Vgh)
 $1H$, (17a)(2) (Vgl) , (11a) (
 14) (18) 가 , N (
 , $N=10$) , (19) 10 가 (11a)
 (2) , 1 (17b)(2) (Vgh) 가 ,

EL (15) 가 (17b)(1) (Vgl) 가 (1) (17a)(1) (Vgh)

(3) $1H$ (15) 가 (17a)(3) (17b)(3) (Vgh) 가
(Vgh) 가 (17b)(1)(2) (Vgl) 가 (17a)(1)(2)

10 $1H$ (50) 10 15, EL (15)
가 (1/10) (1/10)
, N 가 52 ()

가 EL (15) (18)
, EL (15) N
, EL (15) (EL (15) (分流))

가 $0.2\mu A$ (15) $2.2\mu A$ (11a) $2.2\mu A$
, $0.2\mu A$ EL (281) , $2\mu A$ EL (136)
, 27

가 (18) EL N 가 (11a) N
가 (53) , 5 EL (52) (50)

13 (a) (50) 13 (a) (51a)
IC(14) (18) 가 , 13 $1H$
1 , $1H$, $2H$

(18)
(18) (62)
가 (18) 가 (16)

13 (a) (17a) (18) 가 (11a)
(15) (17b) 가 EL (15) 가 EL
(11d)가 (18) EL (15) , EL
(19) 가 (52) , 1

13 (b) 가 (52)

N(, N=10) 10
(50) 90% (52) Q
CIF 220 (S=220) , 22 (53) , 220-22=198 (52)
() S , S/N (53) , S(N-1)/N (5)
3) N (52) () (52) (11d)
N

10 (50) 90%
(52) , RGB (52)
(52) , B , 1/10 (52) , G , 1/6

RGB, R, G, B (52)((53))
 , R, G, B (17b) , RGB 가
 , (41)
).

13 (b) (51a) (52) (5
 1a) S/N(1F/N) (53) (가 (53)
 , ,)
 ,

13 , 1 (53) 가 ,
 (53) ,

, 16 (53) S(N-1)/N
 (, S (50)), 13
 (53) () 4 ,

(53a) 1 (53b) 2 (53c) 1 (5
 3d) 4 , (52)

, () (53) S/10 , 1 () (53) S/10 , 2 ()
) (53) (53) S/20 , 3 () (53) S/20 , 4 ()
 () (53) S/5 , 4 () S/10
 , R, G, B , () L
 , 가 () 4 ()

, 1 1 , (16) (50) ()
)

, R, G, B , () L , , RGB 가 K
 , G , G RB ,

, (53) , 1 (11d)
 , () ()

, (53) ,

52) , 45Hz (52) 6 ()
 , 20Hz

17 (17) EL 17
 (17b) Vgl (1F/N) K (K) , Vgl 1F/(K · N)
 K , 1F/(K · N) K (53) , 1F/N
 , 가 K , 가 가
 , , 가 (52)
 , 가 (52)

(52) , /

(17a) (Vgl) 가 (Vgh) 가 ,
 (17b) (Vgh) 가 (Vgl) 가 (11b, 11d) ,
 (19) ()

66 (51) (53)
 () , 1
 (17b) 가 , EL (15) ,
 (17a) 가 , 3 μ sec
 (17b) 가 , EL (15)
 66 (51) (52)

67 67 1

67 (a) (17a) (Vgl) 가 1 (1H)
 (17a) 가 , (17b) 가
 가 . A 1 μ sec , A 3 μ sec (Vgl)

67 (a) (17a) 가 (17b) , 1 ()
 가 (11b, 11c)가 (17b) 가 (16)

67 (b) (17a) (Vgl) 가 1 (1H)
 (17a) 가 , (17b) , C (17b)
 (Vgl) 가 . C 1 μ sec , C 3 μ sec

67 (b) (17a) 가 (17b) , 1 ()
 가 (11b, 11c)가 (17b) 가 (16)

67 (c) (17a) (Vgl) 가 1 (1H)
 (17a) 가 , (17b) , (17a) (Vgl) 가
 1H 가

67 (c) (17a) 가 (17b) , 1 ()
 가 (11b, 11c)가 (17b) 가 (16)

1 , 63, 64, 65

17 (17b) Vgl (1 (11d)가
 , 1F/N) (K) , Vgl 1F/(K · N) K

$\frac{1F}{(K \cdot N)}$ (50) $L(L \neq K)$, $\frac{1F}{(K \cdot N)}$ $L(L \neq K)$ (15) ()
 , R, G, B L
 , L , L
 L () (50) , L=2 L=3 50%
 () L (50) L (1H)
 $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{8}$, 1H
 , EL (15) , EL (19) (11a) , ()
 50) (,) (32, 33, 53, 54
 (50) (,)
).
 18 16 (17b) (1, 2, 64, 65 (17b) (11d) , 18 15 63
 (631) (631) (17b) (17b)
 (Vgl Vgh) 15
 EL
 , 1 (11d) , 38,
 51 (11e)
 1 (16) (19) 1F
 가 () 가 (16) (631)
 (EL (15) (11d, 11e)
 (15) 가 (11) EL (15)
 (11e) , 43 (11d), 51
 (19) 가 1 () (19)
 () (11a)가 1 (1) EL (15) , 65%
 가 65% (16) , EL (15) 가 100%
 () (16) EL (15) 가 65%
 (19) (11b)
 1 , 1 (11)
 가 (11d) , 가, CRT 가 (18)
 (12) (14)
 , N, K (11d)
 () , 1 (1) , 2
 ()
 , 1 (1) () ,

() , () ,
 , , , ,
 , , , ,
 , (52) 1 () , 1 3 , 1
 2 () , R, 2 G, 3 B , 3 1 , 1
 , 1 (1H) , R, G, B 가 (75 82).
 (52) 가
 , () (52) (53) 가
 , (52) , (53) 1/3 ,
 , 1/3 1 (11d)
 , B Vgl 1 , 2 (52) , R, G
 (53) ()가 (53) (53) (50) , (50)
 , 20% , (53) 2 가 100(nt) , (53) (50) 10%
 , (50) (50) (53) (52)
 (53) (61)(6) (ST2) 16 13
 , (, 13 16 (52) IC
 가 (52) 가). 1F (, (52) , (5
 0) , (50) 16 , 가 13
 , (61) 가
 19 (a) 13 (53) 19(a1) (50) 가 가
 가 가 19(a2) (50) 가 , 19(a3) (50) 가 가
 . 19(a1) 19(a3) (,) , (12)
 (61) , 1 Vdd ()
 가 가 , (14)가
 가 , (50)
 , 19(a1) 19(a3) , (50)
 , (50) 가 , 6
 4 , , 64
 19 (b) , 16 (53) 19(bl)
 (50) 가 가 19(b2) (50) 가 , 19(b3) (50)
 가 가 19(b1) 19(b3) (,) ,
 (12) (61) , 19 (b)
 (53) ,
 , 19 (c) (53)
 , 19 (a) 1
 , 19 (c) 1

9 (a) 19 (c) , (61) .

19 (52) (50) 1/2 (53) (52) 19(c1) (53) .

20 (18) 20 , EL (15) , 1 , N=10 , 5 , M 5 (18) 10 , 1/5가 (18) .

20 N EL (15) (18) 가 , EL (15) IC(14) N/M (1) 가 M/N (18) , 1 ,

18) (16) (11a) (14) N () , () 가 (14) , ()

1 (I) M/N , EL (15) (1F(N-1) M/N) , 1F () , ()

가 (18) N , , M , N , 1 (14) (14)() (50) 가 , 2 , 2.5 5.25 (50)

16) M/N , M/10 , M/5 , M/2.5 (14) (50) , N (50) 가 , M (50)

21 , 20 Vgh(H) , Vgl(L) (17) ((1)(2)(3)) QCIF 220 , VGA 480

21 (17a)(1) (1) (17a) Vgl 가), (11a) (14) (18) 가 (1) (51a) (1)

(18) N (, N=10 가 , (16)) , 5 (M=5) (19) 2 (N/M=10/5=2) 가 (11a)

(1) , 21 (1)(2)(3)(4)(5) (11b), (1)(2)(3)(4)(5) (17a)
(2)(3)(4)(5) (11a) 가 (11c)가 , 5H (1
, (1)(2)(3)(4)(5) (17a) 가 , (1)(2)(3)(4)(5) (17b)
가 (1)(2)(3)(4)(5) (11d)가 ,
EL (15) 가 (52) .

(17a) 가 ((1)(2)(3)
(4)(5)) (17b) 가 , (11d)
((1)(2)(3)(4)(5)) , 20
(11d) (11d) , 20 , (51)
(11d) , (52) . (52) 19

1, 2 , EL (15) , 38

, ((17a) 가) , 1
. 1

가 .

, 5 (11a)가, lw×2 (18) (, lw (18)
lw×2×N=lw×2×5=lw×10. N 가 lw , lw
10 가 (18)).

() , (1)(2)(3)(4)(5) (19) , 2 가 .
, (11a) (Vt, S) .

5 (K=5) , 5 (11a)가 , 1 , 10/5=
2 가 가 (11a) . (18) , 5 (16) (11a) (18) lw×1
가 가 (1) (51a) , , lw (51b) (18) (18)
(2)(3)(4)(5) , (51b)(20 (1) 20 (51a)가 (1) ,
, (51b)가 (2)(3)(4)(5)) , 가

, 4 (51b) , 1H (51a) . (51a) 가
(51b) (52) (20 (b)). , 38
(51a)

1H , (17a)(1) (21 , (17b) (Vgl) 가 .
21 6H (6) (11a) , (14) (17a)(6) (Vgl) 가
가 , (6) , (1) 가 , (18) (1) 가
(6) 가 .

, 1H (17a)(2) , (2) (17b) (Vgl)
가 (21 7H (11a)). , , (17a)(7) (Vgl) 가),
(7) (14) (18) 1 가 .
1 (50) .

20 , 2 () , EL (15)
2 (, 2). ,
2 , 16 (51) ,

(50) 1/2 (52) .

13 가 , 20 (53) , , (53)

(K) . , 22 , (53)

23 (17) 가 . 21 23 , (Vgl Vgh) (17b)

(17b) 21 , .

(53) . , .

EL (15) , 5 μ sec 가 .

, EL (15) , (17b) 가 (52)

) , KHz 가 가 (52)

24 2 . , .

, 2 (11a) (18) 가 (7 ,

). .

, Vt, , S

(18) (7), (18) (,)

, , 가,

, 가 (71) , 24

. (18)

(11a) (11a)).

, 1H(1) (, 1

. (18) (18)

(11a) (18) 가

, (18) (18)

. 1H , , 2

H , , ,

. , ,

, 1 , 1 , 2

2 , 1 , 4 1 , 3 3 , 2

, 4 , 4 6 3 5

1 1 3 5

64, 65 38, 42, 50 63, 62 (18) 가

21 5 24 (1) (17a) (1)(2)가 (11b), (11c)가 (17b) 가

(25 (17a) (1)(2) 가 (11d)가 (52) 24 (53) 5

1H 2H (1)(2) (11d)가 EL (15) 가 (52) 24 (53) 5

2 () (11a)가, lw×5(N=10 (18) K=2 (16) (18) (19) 5 가

lw×K×5=1w×10 (18) (16) (19) 5 가

2 (K=2) 2 (11a)가 1 10/2= 가 (11a) (18) 2 (11a) 가

(51a) , Id (18) lw×10 (51b) 1H (51a) (52) 가 (51a) 가 (51b)

1H (17a)(1) (17b) (Vgl) 가 (17a)(3) (Vgl) (3) (11a) (1) (14) 가 (18) 가

1H (17a)(2) (17b) (Vgl) 가 (17a)(4) (Vgl) (4) (11a) (2) (14) 가 (18) 가

1 1 (2 1) 1 16 가 (15) 24 5 () (53) 5 EL (15) 16 (51) 1 1/5 (52) 27 (51)(51a, 51b) (50) (26 26 (16a 16b) (b) (51a) (51b) (51a) (51a) 2 가 (18) 가 (51a) (51a) 27 (b) (50) (281) () (50) (50) (281) (281) (50) (50) 가 (281) (50)

L (15) (281) , 1 (11d), E
(281)

28 27 (b) 28 (50) (281) (50) (50) (

16c) (281) (11) EL (15), (11d), (17b) (1

5) 28 (281) EL (15), (11d), (17b) (281)

EL (15), (11d), (16) (17b) , 가 가

27 (50) (281 (,) ,

29 (a) (50) (281) (50)

29 (b) (281) () ,

2 (23) , 5 (28

1) 4 134 (50) 134 (281) 4 (281)

(281) EL (15) (11a, 11b, 11c)), (19)

(17b), EL (15)

(281) M-1 10 , 10-

1=9 5 , 5-1=4

135 (281) (281) (50)

135 (a) 2 (M=2) (281) 135 (b

) 3 (M=3) (281) 135 (c) 4 (M=5)

(M=4) (281) 135 (d) 5 (281) 4

2 5

2 , 1 , 2 , 2 M-1) ×

2 가 가 , (

136, 137 () 136 2

136 (281) 135 가 (50)

2 (281) (11b, 11c) (281)

136 (a) (50) () 136 (b) (5

0) () 136 (c) (50) (281)

, (281) 2 , .

136 , (50) , (281) (14) (281) (1

37). 137 (a)가 , 137 (b) 1 .

, 136 , (281) , (51) (18)

, (281) (51) 1

, 2 가, 3.5 .

(11a) W((281)), L((18)) . W (281) (18)

, W (18) (50) (16)

(11a) W/L , (281) (11a) W/L ,

(281) (50) (281) (281)

, 136 1 ,

, 24 .

136 , (281) , (281) , (2

81) (50) , 36 ,

, , 1 2 가 , 1 . NTSC ,

, 2 , 1

133 , 133 (a) 1 , 133 (b) 2

, 24 2 .

1 1 2 ,

, 24 가 .

2 2 2 ,

1 2 2 , 1

, 2 , 1 2

, 134 (281) .

2 1 , 1 ,

(13) . , 1 , 1

1 2 , 가 , 3 , 4 , 1 ,

, 5 6 , 479 480

, 1 .

2 , 2 3 , 가 , 4 5

479 , 480 6 7 481 , 2 , 478

, 2 , 1

(1, 3, 5, 7, 9, 479) , 2 , (2, 4, 6, 8, 10,480)

24 , 1

, 24 (52) , 2

, 24 (52) .

, 15, 21 1 1

, , 2

N

127 (17a) (12a1) (17b) (12b2) (12b1) (17b)

(12a1) () 가
(12b1) () EL 가
(12a2) () 가
(12b2) () EL 가

128 (a) 1 128 (b) 2
(12) (12a1)가 , EL
(15) 128 (a) 1 (12b2)가 , EL 128 (b) 2 (12b1)
(12a2)가 , EL (15)

가

129가 1 129 (a)가 (()
(129(a1)→(a2)→(a3) 가 1
() 129 (b)가
(129 (b) , 129 (b) 129 (c)
(15) EL (53) (52) (N
(129 (b) , 129 (c)
)

130 2 130 (a)가 (()
(130(a1)→(a2)→(a3) 가 2
() 130 (b)가
(130 (b) , 130 (b) 130 (c)
(15) EL (53) (52) (N
(130 (b) , 130 (c)
)

EL , N
(15) () , EL

129, 130 131 (52)(
() 131 , EL (15) (12
(129, 130)
b1, 12b2) () ()
(38) (51)
가 (12b1 12b2) 2
(12b)

131 132 132
((53), (52))
(53) (52) (53)
(52)

, 1 ()

, 133 2 () ()
 , 130, 129 , 66 .
 , 가 가 , (11a)
 , EL
 (15) . EL (15) 가 EL (15)가 .
 30 30 , $1/2H$ ($1/2$) 22, 29
 , $1/2H$ ($1/2$) 5, 13
 , 1 , (11a)
 , .
 30 , , 1 5 , 2 1
 , 1 ($1/2H$) , 30(a1) , 5
 22 (18)
 25 (16) (11a)(1) 5 (25/5
 =5)가 25 (18)
 (18) 25 , 가 $1/2H$ (1 (16) (19) 5
 1/2)
 5 가 5
 (11d) , 30(a2) .
 $1/2H$, 1 () 30(bl)
 (51a) 5 () 30(a1) 30(b1)
 (19)
 , 30(a1) , 가 1 가
 , (11a) , 2 ,
 (52) 13 가 (51a)
 31 30 2 ISEL 31 , $1H$ (1) 2
 ISEL 30 (14) , A
 B , 8 DA DA
 B 5 30 , A 25 A B ISEL
 () 가 (18) 가 .
 ISEL , L , 25 A가 (18) A가
 IC(14)가 (, (14)
). 25 , 5 .
 30 (1) (30 $1H$) , (17a) (1)(2)
 (3)(4)(5)가 (1) . (1)(2)(3)(4)(5) (11b),
 (11c)가 , ISEL L , 25 A가 , (1)(2)(3
 (18) (17b) , (Vgh) 가 ,
)(4)(5) (11d)가 , EL (15) 가 .
 , (52) .

(19) , 5 (11a)가, lw×2 (18) , (16) (11a) (Vt, S

5 가 (11a) (K=5) , 5 (11a)가 , 1 , 25/5= 가 (18) , 5 (112) t lw (51b) (18) , lw×25 (51a) (1) (51b) (18) 가 가 (51b) 가 가 (51b) , 1H 51a (52) , (51a) 가 (51b)

1/2H.(1/2) (51a) , (1) 3 l (Vgh)가 가 (17a)(1) (Vgl) 가 , (17a)(2)(3)(4)(5) (1) (11a) (18) (2)(3)(4)(5) (11b), (11c)가 , B가 , B (18) , ISEL H , 5 (17b) 1/2H 가 , (Vgh) L 가 (1)(2)(3)(4)(5) (52) (11d)가 , E (15) 가 (52)

(1) , (1) (11a)가, lw×5 (18) , (1) (19) , 5 가

1 , (2) 1/2H (2) (17a) (2)(3)(4)(5)(6) (2)(3)(4)(5)(6) (11b), (11c)가 , ISEL L L , 25 A가 , (18) , (17b) , (Vgh) 가 , (2)(3)(4)(5)(6) (11d) 가 (1) , EL (15) 가 , (52) , (1) EL (15) (17b)(1) Vgl 가 , (11d) , (1)

5 가 (11a) (K=5) , 5 (11a)가 , 1 , 25/5= 가 (18) , 5 (11a)

1/2H.(1/2) (51a) , (2) 3 l (Vgh)가 가 (17a)(2) , (Vgl) 가 , (17a)(3)(4)(5)(6) (1)(2) (11a) (1) EL (15) (11b), (2) (11c)가 (18) , ISEL H , 5 (17b) B가 , (1222b) (18) , (2)(3)(4)(5)(6)) 1/2H 가 , (Vgh) 가 , (11d)가 , EL (15) 가 , (52)

(2) , (2) (11a)가, lw×5 (18) 1 (19) 5 가

30 , 1 2 G (G 2) , N , N (B G , 1)

1 G (G 2) 가 N (B G , 1)

(, , 1)가 N .

30(a1) (18) $5 \times 2 = 10$ 가 (11a) 10 (11a) 2 30(b1) , 1 .

31 , 1/2H , 1 1/2H
 $3/4H$, 1
 $1H$, 2H , 1.5H

30 , 5 1/2H , 2 2

30 , 5 1 1/2H , 1 2 1/2
H 2 5 , 2 , 1 , 5 3 , 2
, 1

1

126 1 , 126(a2) (281) , 1 . 1 2

126(a1)(1 IC(14)가 , 1 126(a2)(2 IC(14)가 , 126(a2) 2
duty 1/2 $\times 2 = 1/1$, 126(a2) duty 2 (, 126(a1) duty 1/2 , 126(a2) d
2

126(a1) , 126(a1) 가 (, 126(a2) 126(a2)
126(a1) , 126(a2) 126(a1) 126(a2) ,
(12)

126(a2) 2 , 1
(126(a1)) 1/2 , 126(a2) duty
2 (, 126(a1) duty 1/2 , 126(a2) duty 1/2 $\times 2 = 1/1$, 126 (b)
(52) (53)

(52) (53) , (12) 126 (b) 가 .

126(a2) 2 , 2
, 123 , 2

N , (17b) , 1H
가 , EL (15)가 1F/N
(17b)
(61a, 61b) 가
(17b) Vgl
(17b) 가 ST2

ST1, ST2
ST2가 H , (17b) Vgh가 ,

1F/N L , H . ST2 1H CLK2

, EL (15) 0.5 msec 가 가 , ,
 , EL 0.5 μ sec 100msec , ,
 sec 30 msec 3 msec 20 msec 2 m

, 152 , ,
 , 1 8 , 1 5

, 75% ((52)) , 25%가 ((53)) , 75% (N=4)
 52)) 75% 3 1 25% 25/3%
 (3) , 가 ,

1H). NTSC , 1 5 10 (3
 , /2 , 2, 4, 8, 16 , ,
 , , 가

, 9) , 0.25 1 0.2 0.9 (N 1.2
 . 0.20 가 0.6 (N 1.25 6) ,
 . 0.9 , 가 ,

2Hz , 1 65Hz)가 , 10 100 (10Hz 100Hz)가 , 가 12 65 (I
 , (14) 가 , 가

, (18) 가 , (17) (17) , (18) 가 () , (33, 35
) (17) ,

, 38 , 43, 51, 54
 , 38 , (11d) , 43 (11d) , 51
 (11e) , 63 (631)
 , EL (15) , N

, (17b) 1F/N , Vgl 1F(1F EL (15)
) , (1H) , (17b) Vgl EL (15)
 . 1 (19)

, 가 , 가
 , K

K ((53)) . 6 ST 가

(1F L) 가 .

16 , (17b) Vgl (1F/N) (K) , Vgl
 $1F/(K/N)$, K (15) () . $1F/(K/N)$ L(L ≠ K)
N) , EL (50) , $1F/(K/$
L(L ≠ K) , L (50)
, L=2 L=3 50% ()
(,)
). N .

, EL (15) (11a) (11d) ()
(11d) (50) . , ,
, ,
(11a) , 32 ,
32 1 32 lw 가 EL (15) ,
EL (15)가 , (11a) () 32 ,
(11a) ()

1 , (11b) (11c)
(11a)(WR), (11b) (11c)
(11a) (11c) (11c)(EL) 2
(61) 6

WR EL WR ()
) , EL 가 (18) 가
(16) 가 (가 ()) WR (18) 가
WR EL EL 가
(61a 61b) 가 P
(61a 61b) Vgh()
(61a) Vgl() (61b) Vgl()

33 , 33 , 33
(a) , (11c), (11d) (11b) , lb 가
(11a) (D) (G) ,
(11d)가 (11b)가 lb가 (11a)
(G) (11a) (11a) (G) (D) 가
(11a) ()

(11a) () , 51
가 , 33 (a) (19)
(11a) (11a)가 (, 33 (a)
)가 (0

33 (a) (11b), (11c) , (11d)
(11a) ,
EL (15) 가 EL (15)가 ,
가 1H(1) 0.1% 10%
0.2% 2% 0.2 μ sec 5 μ sec
(16) (33 (a))
(11a) (D) , 33 (a)

lb ,

33 (a) , lb 가 , (19)
33 (a) 가 , 33 (a) , 1H 5H
, R, G, B EL
가 , EL 가 , RGB , EL ,가
1H 5H , ()
, 5H , ()
33 (a) , 1H 5H , 33 (b) 33 (b) (11
c), (11b) , (11d) 33 (b) , lw ()
(14) lw
(11a) lw가 ,
(11a) (G) (19)).
lw가 0(A) , (11a) 33 (a) 가
33 (b)
(11a) 가 ,
33 (b) , 33 (c) (11b), (11c)
EL (15) (11d) , (11a) lw(=le) EL (15)
33 (c) , 1
33 () , (11a) EL (15) (가
(D) (G) (S) (G)
(G) 2 2 1
1 () 2 , 32 , 2
(11c) , (11b)
(, 가), ,
() , 1H ((11d)가
). , EL (15) 가 , ()
, 1H , 5H , 33 (a)
a) (6) , 5H , 5
1 , 4
1 (1) , (1)(2)(3)(4) 2
(3)(4)(5)(6) , (5)(6)(7)(8) 가
4 (7)(8)(9)(10)
33 (b), 33 (c) 33 (a)
, 1 , 33 (b)(c) (1
(1) ,
(,). ,
32 , (17a) (17c)
1 , 1
(17a) 가 , (11b, 11c)가

가, (11b) (11c) 가 (11b)가 (11c)가
(17a) 가 (11b)가 (11c)가
(11c)가 (11b)가 (19) 33 (a)
(16) (19) (11b)가 (11c)가
(19) (11b)가 (11c)가
가 (19)
(17a) 가 (17c) 가 (가)
(11b)가 (11c)가 (17c)가 (16) (가)
(17a, 17c) 가 (11b, 11c)가 (17c)가
(17a) 33 (a) 1 가 (가)
(11d) 1 가
(11a) (O.1 μ sec 10 μ sec (19) 1H 1/1000 1/10 (가)
(11b)
(11a) (11c)
(11d)가 32 (11c)가 38 (11a) 32
(11d) (17a1) (17a2) 가
(16) (11c, 11d)가 (17a1) (17a2) (17a1, 17a2) 가
(11e) 1 가 (가)
33 32 N 22 (17b) N/K (11d)
22
가
34 (17b) (17a) (12a) 32 (11b)가 (1
7a) (17b) (17c) (11d)가 (17c)
가 (12b) 32 (11c)가
(17a) (12a) (17c) (12b)
(11b) (11a) (11)
1c) 6 (12a 12b) (12)

35 (11a) (17a) 가 , (11b) ,
 (17b) (11d)
 , 32 (a) lb 가 .
 , (1) , 1H (17c) 가 , (17a)
 , 가 (17b) 가 (1) 1H ,
 , (11d) , EL (15) 가 .
 2H (17c) 가 , (17a) 가 , (11d) (
 17b) , EL 가 (1) 2H ,
 , EL (15) 가 .
 3H (17c) 가 , (17a) 가 ,
 (17b) , EL (15) 가 , (1) 3H , (11d)
 , EL (15) 가 .
 , 1H (1 (19) (11a) , (11a)
 G Vdd 가 , (11a) () .
 , 가 (11d)가 .
 ,
 35 , 2H (17a) 가 , (11b)가
 , 2H , 1H) ,
 . 2H .
 , 1H H ,
 DATA (12) DATA(ST) , ST
 DATA 2H H DATA 5H (17a) 2H
 가 , ST (17a)
 5H .
 1H (1) (17c)(1) 가 (11c)가 ,
 (18) 가 lw가 (11c) (11a) .
 , (1) (17c) (17a) 가 , (11c)가 ,
 가 (17a) 가 , (11a) ,
 가 (17b) , (11d)가 (11a)) .
 , 가 EL (15) , (2) (1) 가 , 3
 5 .
 35 , 1H 36 5H H
 (12) DATA(ST) 36
 (12a) ST1 DATA 5H H , (17a)
 5H .
 , 36 , 35 가
 .
 가 , N N
 , N .
 36 5H , (17a) 1H
) (12) DATA(ST) (

34 (12a) 2 (((17a) , (17b)) (12a) . (12a) 가 가 37 (12a) . 37 (12a, 12b) (17) 35 가 , 35 37 가 . 37 OR (371)가 가 , (17a) , (61a) OR , (17a) , 32 , OR H () , (17a) . 37 (61a) , 2H , (17a) , (17c) (61a) , 1H , 가 . (61a) 2 H 가 , (16)(1) (17 c) , (16)(1)가 () , (16)(2) (17a) , (16)(2) (11b)가 , (16)(2) (11a) 가 . (61a) 3 H 가 , (16)(2) (1 7c) , (16)(2)가 () , (16)(3) (17 a) , (16)(3) (11b)가 , (16)(3) (11a)가 , 2H , (17a) , (17c) 1H , . (11b) (11c)가 (33 (b)), (33 (c)) , (11c)가 (11b) , 33 (b) 가 , (17a) (11c)가 (11b) 가 가 . (17c) (11b) 가 . 32(1) . , 38 (11e) , 13, 15 N 39 38 , 39 . 39 (a) , (11c), (11e) , (11d) , (11b) (D) (G) , lb 가 , (19) 1F () , (11d)가 , (11e)가 , (11d)가 (D) 가 , lb가 (11a) (G) (G) , (11a) (G) (D) 가 (G) , (11a) (G) (11b) (G) (11a) (G) , (11b) . (11a), (11b) () , 51 가 , 39 (a) , (19) , (11) 가) (가 . (11a), (11b) , 39 (a) , (19) (11a), (11b) 가 . (0)) 가 (가 . 39 (a) 33 (a) 가 , lb 가 , (19) , 39 (a) , 1H 10H(10) 가 1H

5H , 20 μ sec 2 msec 33, 34

가 .

33 (a) 가 , 39 (a) , 39 (b)

가 (a) , 39 (b) ()

(b) 가 () , 33 (b) 39

1H 5H , 1H 10H(10) 가

20 μ sec 2 msec

(11)가 (11)가

(50)

13 (52) (52) ()

N

39 (a) , 39 (b) 39 (b) (11c), (11d) ,

(11e) 39 (b) ,

(14) lw () , lw (11) (19)

a) lw가 0(A)() , (11b) 33 (a) 가

39 (b) ()

가) , (11a) (11b)

가 ,

39 (b) , 39 (c) (11c), (11d)

(11e) , (11b) lw(=le) EL (15) ,

EL (15) 39 (c) ,

33, 39 () , (11a) (11b) EL (15)

(가 (11e) (11d)) , ,

(D) (G) (S) (G) ,

(G) 2 2) 1 , 2 1 (

1 (11a) (11b) EL (15)

EL (15) , 1 (11a) (11b)

1 (D) 가 (G)

39 (11b) (11a) ,

39 , a (D) (11b) EL (15)

(G) (G) (S)

(G) 2 2) 1 , 2 1

() 2

(, H 가) , ,

() , H 가 ,

43

() .

43 (17e) , (11a) (11e)가 (11a) (G) (D) 가 , (11e)가 (11a) (15) (11a) (11d)가 , 44 , () .

44 (a) , (11b), (11d) , (11e) (11a) (D) (G) , (11a) (G) (D) 가 , 3 (11a) () , (11a) , 33 (11e) 9 , HD (11d) , HD , 44 (a) .

(11a), (11b) () , 41 () , 44 (a) (19) , () , 44 (a) (19) (11a) (11a)가 (, (O)) (가) .

, , lb 가 , (19) , 44 (a) , 44 (a) 0.5H 4H 가 , 0.2H 5H(5 400 μ sec) 가 , (17e) (17a) , (17e) (17a) 1H , 2 (11a) .

(N) , (17e)(N), (17a)(N) . 1H (17e)(N-1), (17a)(N-1) (N-1) , 1H (N+1) , (17e)(N+1), (17a)(N+1) .

(N-1) H , (N-1) (17a)(N-1) 가 , (N) (17e)(N) 가 , (17a)(N-1) (18) , (N-1) (11b)(N-1)가 , (11a)(N-1) (G) (N) (11e)(N)가 , (11a)(N) (G) (D) 가 , (11a)(N)가 .

(N-1) H (N) , (N) (17a)(N) 가 , (N+1)) (17e)(N+1) 가 , (N) (11b)(N))가 , (18) 가 (11a)(N) (G) (11e)(N+1)가 , (11a)(N+1) (G) (D) 가 , (11a)(N+1)가 .

가 , (N) H (N+1) , (N+1) (17a)(N+1) 가 , (N+1) 가 , (N+2) (17e)(N+2) (18) 가 (11b)(N+1)가 , (N+2) (11e)(N+2)가 (11a)(N+1) (G) (11a)(N+2) (G) (D) 가 , (11a)(N

+2)가

, 1H , (11a) , ()

33 (a) 가 , 44 (a) , 44 (b) ()

가 () . (11)가 ,

(11a)가 ,

(12)

44 (a) , 44 (b) . 44 (b) (11b) , (11e),

(11d) . 44 (b) ,

(14) , (11a) (G) (19) . , (11a) (G)

() , 13, 15 N

, (11d) N/K (1

, (11e)) 가 , (

11e)가 ,

43 44 ,

가) ,

(11a) 가 ,

44 (b) , 44 (c) , EL (11b) (15) , EL (15) ,

(11d) , (11a)

43 , HD

(11d) , (11e) , (11a) 1 ,

(11a) EL (15) , (11a) (D) (G) 2 ()

(S) (G) , (11a) (G) 3

2 ,

(11a)(1) EL (15)

, (11d) , (17b) (61)((12))가 , (17b) (

61) 가 , (17b) (61)

40

1

, 38 () ,

, 41

, EL (15) , 50

가 ,

40 , (12) (71)

(14) (18) IC(12) (71) ,

40 (17a) (12) , (1

7b) (401) 40 4 (17b) (401)

, 4 (17b) (50) 5 , 10
가 가 , 20 (401) 가 (401)
, QCIF 가 220 , 220/5=44
가 , 220/10=11 가 , 2 가
40 (Vgh) 가 (401a, 401b, 401c, 401d.....401n) (Vgl) 가
EL (15)
17b) 40 (401) (17b) (401) (17b) (401) (17b) 가가
(401) (401) (17b)
(12) (17a) (17a) 가
(11b, 11c) (18) 가 ()
(19) (401) (Vgl) (17b) (11d) (G)
(Vgh) 가 , EL (15) (11a) EL (15)
401 가 (12)가 (17a)
(Vgl) 1 (1H)
(401) 가 , EL (15) (14)
가 (19) 가 (401) 가 (16)
1H , 1/2H , 1/4H
38 (11e) (17b) (401)
32 (17a) (401) ()
, 1 ()
()
41 (17a) 3 (16R, 16G, 16B) 1 R 41
, G , B
(17a) (16R), (16G) (16B)가
(16R) (18R) (19R) (16G) (18G)
(19G) (16B) (18b) (19b)
(16R) (11d) (17bR) (16G) (11d)
(17bG) (16B) (11d) (17bB)
(16R) EL (15R), (16G) EL (15G), (16B) EL (15b)
, EL (15R), EL (15G), EL (15b) (17bR, 17bG, 17bB)

가 .

(61) , (17bR) , 6 , (17a) (61) , (17bG) (61) 4 () .

(18) N , EL (15) N $1/N$ (19) (19) () (19) , 5 N=5 (15) , N=10 EL (15) EL (15) 가 EL (15) .

(11a)(1 EL (15)) () , EL (15) (19) (14) .

1 (11b, 11c) N (19) , 10Hz 가 (19) .

가 가 , EL (15) 가 ,

1 . P (11b, 11c) P (11b)가 V_{gh} (19) V_{dd} , (11a) (G) (1) ,

(17a) (11a) (G) (19b) (19a) , 1/ 50 가 (42 (a)) . (19b) (19a) 1/10 () 가 1/40 1/15 . (11b) - 2 (- (SG) - (GD)) 1 10 (19b) (19a) , SG (6 (11a) (G)) (11d) (S) , (19a) () , (19b) (C_b (pF)) , (19a) (C_a (pF) V_w (11a) (O . ,) (G)) V_b 가 .

$$Ca/(200 C_b) \leq |V_w - V_b| \leq Ca/(8C_b)$$

, $|V_w - V_b|$, (,) .

$$Ca/(100C_b) \leq |V_w - V_b| \leq Ca/(10C_b)$$

(11b) P , P
 (GD)) (, 4) 1 (11b) (SG
 10
 , 1 , 42 (b)
 (11a) (G) (11c) N (17a) 17b)
 (11c, 11d) P
 (41) (17c) (11a) (G)
 (19c) (11c) (19b) (17a)
 (19c) (11c) (D) (11a) (G) (19c) (11c) (D) (17a)
 (17a) 19b)) , (17c) (19c) (11c) (D) (17a)
 Cc(, (19a) Ca , (11c 11d) - (Vgh)
 , 가 가 (Vgl) ,

$$0.05(V) \leq (V_{gh} - V_{gl}) \times (C_c / C_a) \leq 0.8(V)$$

$$0.1(V) \leq (V_{gh} - V_{gl}) \times (C_c / C_a) \leq 0.5(V)$$
 (G) 43 (17a) 43 (19b) (11a)
 (11) (19b) , (17)
 , 가
 (19b) (11b, 11c)(1)
 (19b) 가 W (11b, 11c) W/ L=6/6 μ m
 2:1 20:1 , W:L (19b) 3:1 10:1 , W:L
 B , EL (15) (19b) , 가 R, G, B () R, G,
 , EL (15) (11a) (G) , EL (15)
 , R (11bR) 0.02pF , (G, B) (11bG, 11bB) 0.025pF
 , R (11bR) 0.02pF , G (11bG) 0.03pF , B
 (11bB) 0.025pF RGB (11b) RGB
 (19b) (19a)
 (19b) (19b) R, G, B (19a)
 OpF , G (11aG) 1.2pF , B (11aB) 0.9pF (11aR) 1.
 (19b) , R, G, B (19a)
 (19a) (19b) , R, G, B (19b) R, G, B
 (50) (19b) (12) 가

(16) (17) (17) (12) 가 (16) (19b) 10% (19a) (19b) (19b) (19a) (19a) (19b) N 가 Vm EL 가 EL (15) 가 가 N , EL (15) 1 (1) RGB , 1 3 B , 1 R 2 G , 3 B 75 (14) (996) R, G, B 1/3 (14) 48 (14) (996) (751) (18R, 1 8G, 18B) (751) (14) , COG (71) (71) (751) (751) 75 I (14) (14) (14) (14) (18) R) 가 (752)가 R (18G) 가 (752)가 G (18b) 가 (752)가 B (14) (14) (14) 76 (16) (18G) 18B 0A (18G) 18B NO (18R) 18B 0A (18R) 18B (16) 76 (16) (18R) 18G 0A (18R) 18G (50) (16) B (50) (16) G (50) (16) R 가 (50) (16) 3 R 가 1 2 (50) (16) B (50) (16) R →G (11d) →B →R →.....가 1 , R (11d) , N , 5, 13, 16 , R (16) , G B

. B (16) . G (16) , R G , R B

. B (16) , R (16) , G B (50) . G (16) . B

(16) , R B , G R

(17a) , 75 , RGB (17aR) , R (11b), (11c) (17aG) , G (11b), (11c) (17aB) , B (11b), (11c) (17b) R , (11d)

G , B (14)가 R (752)가 R (17aR) 가 , aG aB 가 (16) (16) B (16)

2 (14)가 G (752)가 G (17aG) 가 , aR aB 가 (16) (16) B (16)

3 (14)가 B (752)가 B (17aB) 가 , aR aG 가 (16) (16) G (16)

75 , RGB (16) (11b) (17a) 76 , RGB (16) (17a)

75 , (752)가 R , G B

76 (751) (752) a V aa ((752) RGB) . b (14)

76 (752R) Vaa (18R) Vaa () 가 (752G) Vaa (18G) , Vaa () 가 (752B) (14) , (18b) , B 가 가

752) , B 가 , R G 가 (16) (17b) () 가

B (16) , 1 R (16) , 2 G (16) , 3

. 1 (1H) , 1H R , 2H G , 3H B , 4H R , 1/ , , 2H , 1/

3

77 1H , 77 79 , (16) , , , , 75 79 (16) , 13 N M EL (15) , , , 1 3 , 2 , 4 . 1 2 , RGB 3 , 1 , R G , 2 B . 1 , 2 G , 1 , R 가 , 1 4 , RGB 3 , 3 4 B , R 가 , RGB EL (15) , 1 R (16) , 2 G (16) , 3 B (16) , 1 77 , 1 1H R , 2H G , 3H B , 4H R , , , 1/3 , 2H , 77 , 1 1H R , 2H G , 3H B , 4H R R , 2 1H G , 2H B , 3H R , 4H G , 3 B 1H B , 2H R , 3H G , 4H B , R, G, B , R, G, B , 78 , 1H (16) , 2H (16) G , 77 , 1 , 1H (16)) B , 4H (16) R , 3H , 78 , 1H , , R, G, B (가), , R, G, B , , 78 , (RGB) RGB , 76, 77 , 78 , 1H (78 1 1H , R, G, B 3) , 75 , (14)가 () , (752)가 R, G, B () , 79 , RGB 3 , W() (16W) . (16W) , R, G, B, W (16) . 79 (b) 1 , RGBW (16) 79 (a) 1 , 79 77, 78 , N , M

,
 , 2 . RGB , , , RGB 3 가 , R, G, B , R, G, B

,
 , 1 , 75 , 79 RGB , (16)
 (, (11d) , EL (15) , 1 , (11d)
). EL (15)

, 77, 78 , 80 (a) 1 , (1) (11d)(1) , RGB
 (, (, (, (53R), G (53G), B (53b)
 (52) . , . RGB

80 (b) 1 (1) RGB (53)
 16 , , 80 (b) (53)

81 (a) , RGB (53) (53) (, (53)
 . G 가 (53G) B 81 (a) , R (53R) G (53G)
 , 81 (a) B (53b) EL (53) , B ,
 (53b) (53)

81 (b) , 1 () , B 53 B가 (53B1, 53B2) . 81 (a)
 B (53b)
 . 81 (b) , B (53b)

81 (a) 81 (b) , R, G, B (53)
 , , , (16)
 (W , 16 , R, G, B가 (53) . RGB가
 (53) , 81 (a) 81 (b)
 , 81 (a) RGB (53) , 81 (b) RGB (53)

, 80 81 , 75 79 . 41
 , RGB EL (15)(EL (15R), EL (15G), EL (15b))
 80, 81 가 , R (16R) (17bG) (17bR)
 G (16G) , B (16B)
 (17bB) 가

, (12bR), (17bG) , 82 , (17bR)
 (12bB) (12bG), (17bB)
 . 82 (12bR, 12bG, 12bB) 6
 , 80, 81 , 82 ,

16 , 75 78 , (16) (16) ,
 , EL (15R) (17bR), EL (15G) (17bG), EL (,
 15b) bB가 , RGB (17b) , 80,
 81

EL (15) , () ()
 , , 가 , ,
 가

가 , 가 , , 가 .

가 , 가 가 , , 가 .

45 V_m EL (15) , EL (15)
 가 50 100A/ 45 EL (15) 가 100A/ ,
 45 , 100A/ , 2500 가 8(V) , 2500
 , 100A/ 가 10(V) , 10/8=1.25

, 60Hz(V_m 1 60Hz) 가 t_1 V_0
 5 , 0 , 100A/ 가 1/2() , $t_1=0$.
) 8(V) , V_m 8(V) , | $\times t_1$ | /($\times t_2$)= | -8(V)×
 0.5 | /(8(V)×0.5)=1.0

45 , | $\times t_1$ | /($\times t_2$)가 1.0 가 (,
 | $\times t_1$ | /($\times t_2$)가 1.75 가 가 , |
) t_2 , T_1 T_2) $\times t_1$ | /($\times t_2$) 1.0 가 V_m $\times t_1$ | /($\times t_2$)
) 1.75 V_m 가 T_1

, A B , V_m 가 가 . 46 가 ,
 46 A) EL (15) 가 , V_m 가 (

, 45 , 가 , V_0 , 200A/
 (, EL (15)) (, 1 200A/
 가 , 1/2 , 1

, EL (15) , (EL 가)
 EL (15) (, 100A/ ,
)가

, EL (15) 가 () , 0.2 (,
 , 100A/) 0.2

, 45 , $\times t_1$ | /($\times t_2$) 0.2 V_m 가 ,
 , | t_1 (t_2 , T_1 T_2) , | $\times t_1$ | /($\times t_2$)
 $\times t_2$) 1.75×0.2=0.35 V_m 가 T_1

, 45 (| $\times t_1$ | /($\times t_2$)) , 1.0 0.2 가 ,
 , (가) , |
 , $\times t_1$ | /($\times t_2$)가 0.2 , V_m T_1 가 ,
 , | $\times t_1$ | /($\times t_2$) , 45 ,

가 $\times t_2$ 1.75 , , | $\times t_1$ | / (

, , EL (15) 가 V_m () 가 , , V_m 가 .

, EL (15) 가 (15) 가 , , () , V_m 가 .

, , 47 , (11g) N , P

47 , (11g)(N)가 (473) 가 (471) 가 V_m 가 .

47 , 47 V_k 0(V) , (473) , 0(V) (2(V)) , V_{sg} , (471) $V_m(0(V))$,

V_k -5(V)) , (471) (11g)(N)가 , EL (15) ,

(11g) (G) V_m 가) , (471) (473) (, (15) , EL (15) (

) V_m 가 , , (471) (

, 48 , (471) (12c) , (12a) 가 (12c) ,

, (12c) 가 가 .

, EL (15) (11g) (G) V_m 가 , (471) V_m 가 가

, (11g) (G) (S) 가 ,

(11g)가 P 가 .

, V_m 가 , EL (15) ,

(11d)가 (473) 가 (11g) , 47 (11d) P , (17b) (11d) (11g) N

(11g) (G) .

49 , (1) , 1 , (2) (1)(2) ,

, (1) N , (2)가 N+1 , 49 , 1

, 41, 38

1 b)(1) (Vgh) (17a)(1) (Vgl) 가 , 1 (17

, EL (15) 가 ,

(471)(1) , Vs1 ((11g)가) 가 , (11g)가

(Vgh) 가 , (1H 1/200 , 0.5 μ sec) , (17b) 가

(17b) (Vgl) 가 (1H 1/200 , 0.5 μ sec) ,

(11d) (11g)가

(1H) , (17a) (Vgh) 가 , 2 ,

11d)가 (17b)(2) 가 , (17b) (Vgl) 가 , (4
 71)(1) , EL (15) 가 (11a) 가 EL (15)가 , (4
 . 2 (Vsh) 가 , 1 (1) EL (15) 가
 (471)(2) Vsl () 가 .
 , 1
 가 , 48
 가 (40) ,
 N , ,
 , 가 , . EL
 , 가
 1 , , 38, 41 가
 , 50
 50 (11c) (17a1)
 가 , (11c)가 (11d) (11a) (17a
 D)- (G) 가 (GD) (11d) (11a)
 2) 가 .
 (11d) , 가 1H(1 , 1)
 3H (D) 가 . 3H , 3H (11d)가 , (11a) (G) 가
 , EL (15) (11a) (11b) 가
 EL (15)가 , (11g)가 , EL (15) 가 , (11d)
 (11g) (11d)가 , 가
 (11g) (G) Vsg (471) 가 (11g)가 (471) Vsg
 , 가 가() , (17a1) 가
 , (11c)가 (19) 가 ((11d) 가 (14) (18)
 (11d) . 1 (1) (11d)
 , , 1 (1)
 가 , N , N , EL (15) (11d)
 EL (15) 가 () , EL (15)가 ,
 가 , 가 가 , ,
 가 (11g) , ,
 가
 , 1 (16) ((11b), (11c)),
 IC()(14) , IC가 V0(, GND)
 (11a) (D) 가 (11d) EL
 V0 가 , EL (15) Vk V0 , -5 -15(V) Vm
 가 EL (15) 가 , Vdd V0 0 -5(V)
 가 (11a) , EL (15) 가 (14)
 (17) ,
 N 1 (1) , , EL (15) (

(11d)가 (19) () , EL (15) (, 50 , 38, 51, 54, 62 . (11b)가 (15) (11a)가 EL (15) 가 () (11g) () . 51 , EL (15) (18) 가 , (11b)가 (11a) , EL (15) (G) 가 . 51 , 52 . 51 4 . (HD) , (17b) 가 , (11g)가 (17a) 가 , (11c)가 (18) Vdd 가 , (19b) a Vdd 가 , (11a) (D) (11a) (11a) . (17b) 가 , (11e)가 (17c) T1 (17a) 1H 가 , (11b)가 T1 90% , (17a) 1H , T1 1H 20% , 20 μ sec 160 μ sec , Cb:Ca=6:1 1:2 (19b)(Cb) (19a)(Ca) . (11b) , (11a) (G) (D) 가 (11a) (G) (11a) 가, (19b) B (19) () . (17c) 가 (11b)가 (18) Td , DATA () 가 가 , (11a) (G) DATA + () 가 가 . (11a) (17a) 가 , (11c) (11b)가 (18) 1F , (17c) 가 , (17b) , 13, 15 N , 1 . 52 , (19) , (11a) () 가 , 가 , (18) (16) , 53 , (11a) (G) (19) , (11a) Vm EL (15) 가 , (11a)가 가 (11a) Vdd (G) .

(16d) .

1H , (12) (61) 가 1 55 (b
) , 55 (b) (16a) , (16b) ,
(16c) , (16d) .

11a)가 , 가 (17a) , (

(14) , 가 (11) 0 . ,
(18) 가 , (18)
, 1 () (1F) 가 (19) , 1 ,
가 .

1 (1H) (18) 가 가 0
7 , 1 (18) , 가 가 0
(64) . 가 , 0 , 63

, , 가 () . , ()가 . ,
()가 . ,
가 .

0 1/8 , (, 64
, 0 7 0 1/16 , , (, 64
0 3 , , (, 64
) .

가 , 0 가 1, 2 0 . ,
0 1/8 , .

, R, G, B . EL (15) R, G, B
, 가 , R 0 1/8 ,
(, 64 , 01 7 ,
, (, 64) . (G, B) , 0 1/16 ,
, (, 64 , 0 3 , R 7(V) , (G, B) 7.5(V) 가
(18) , EL ,

(16) (19)가 (19) 가 1 (1)
10% 가 () , 1 (11b)
가 .

, (17b) , (11d)
(11b)
(11b)

115 (a) , (19) 가, (11b)
, (11d) 가 (11d)가 , A 가 .
, (19)

16 (53) (52) , 13 (52)
 , 5 (53)
 , 5 , 5 가 , 13 , 16
 5 가 (11d) 가 , 가
 (11d)가 , A 가 , 115 (b) , A
 B (11d) 가 , (19)가 ,
 (19) 가 ,
 , 가 가
 , 가
 1(115) (11a) (11d)가 P ,
 (11d)가 (11b)가 (11d)가 A
 가 (11d)가 N
 (11d)가 (19) 가 (11d)가
 가 N , 가
 ,
 , duty , duty . STN duty ,
 duty 1/1 , 1 (1) , EL (15) 가
 (50) (52) 0% ,
 () , 1 , duty 1
 /1 ,
 1 , 200 ,
 , duty 0/1 , 1 (1) , EL (15) 가
 (50) (52) 100% . EL
 220
 duty , duty 220/220 duty 1/1 . duty 55/220=1/4 , duty 1/4
 . duty 1/4 3/4 (52) , N , N=4 , ()
 . duty 110/220=1/2 , duty 1/2 . duty 1/2 50%가 (52)
 , N ,
 (17a)(1)
 (17a) (12a) WR
 . EL (15) (17b)(1) (17b)(EL) (17
 b) (12b)
 (12) , 가 , 가
 (12a) , WR
 (Vgl) (Vgh) 가 , (12a)
 OEVI ()가 . OEVI 가 L
 (12a) WR (17a)
 116 (a) L(0) ,
 H(1)
 (12a)가 (17a) 가
 (12a)가 (L) , OR OEVI (17a)
 OR (17a) , OEVI H ,
 (Vgh)
 (12b) (17b)(EL)
 (Vgl) (Vgh) 가 (12b) ,

, OEV2 ()가 . OEV2 가 L
 , (12b) (17b)
 , 116 (a) , L(0) , H(1)
 .
 , (12b)가 (EL) ,
 (17b) , OR OEV2 OR (17b) (17b) , OEV2 , 가 H
 L , 가 (17b) (Vgh) , OEV2 (Vgh)
 , OEV2 L , EL 가 (17b)
 , OEV2 , 115 , OEV2 , H
 (17b)(EL) ,
 , (11d) . (11d)
 .
 116 , OEV1 L , (12a)
 , 1 , () , 116 , OEV2
 , 1 , (1H) OEV2 H 가 , 116 (17b)(EL , OEV2
) , OEV2 가 , 1H (12b)가 (17b) 가 (Vgl)
 , OEV2 가 (19) (115),
 .
 116 OEV1 (17a) , OEV2 (17b)
 , (17a) 가 (17a) OEV1 L , WR (17b) OEV2가 H L
 , (17b)(EL) OEV2 가 (A) , EL (17b) 가 (B
) 가 , 116 , OEV2 H 가 , OEV2 H
 가 (A+B) , (17b) ,
 , OEV2 , EL (15)가 , OEV2
 (50) , OEV2 ,
 가 .
 117 , duty 1/1 ((17b)(EL) ,
 , 가 , 1 , WR 가 가 , (17a)
 , (17b)(EL) (17b) 가 가 .
 duty 1/1 (11b) (SD) ,
 (11b)가 , 117 , OEV2 1H , (11d)가 , 115
 , (17b) 가 , (11d)가 (11b) (SD)
 , 115 (b) , (11b) ,
 ,
 , 117 1H OEV2 , 118 , OEV2
 , 2H , 3H , 1 , (17b)
 (11d) . 2 가 ,
 가 , 2 (24) 가 ,
 .
 119 (17b) 가 가 가 , 가 .

(17b) 가 , , 가 가 (17b)
 , 가 , OEV2 (11d) , .
 (11b) , .
 117, 118 , 1H 1H OEV2 H (17b)
 , 1H 가 , 120
 , 1H (17b) 가 .
 (17b) 가 (17b) 가 , . 121
 (17b) 가 , 가 ,
 .
 , (, (17b) 가 .
 가)가 C , 가 C , 1H
 .
 121 , C/S가 0.02 가 (, C/S가 0.02
 가 0 (, duty 1/1 , 2% , 1H=S=100 μ sec , C/S=0.02 2 μ sec
 , 1H=100 μ sec , (17b) 가
 , .
 122 , (17b)(A) , .
 (17b)(B) OEV2 , .
 , OEV2 duty , 1 (1 , duty가 1/1 , OEV2
 , duty 1/1 가 , OEV2
 , OEV2 , duty 1/1 1/2 , duty 1/1 1/2 , 10 (,
) , OEV2
 , OEV2 H , OEV2 H , OEV2 가
 () .
 , , (17b) 가 , , 가 N (,
 , (17b) 가 , 115 , (1
 17b) 가 (B) A 가 (SD)
 9) , (11b)
 .
 116 122 OEV2 , (17b) 가 ,
 , (12b) , (17b) . OEV2 가
 . 123 .
 123 , 1 (52) , (52)
 (52) , 1 , (17) , (52) 1
 , .
 123 , (52) 123 (a)→ 123 (b)→ 123 (c) . 1 (1) ,
 (52) , 124 , 4 .

, 123, 124 , (17b) 가 , 1H
 , 125 E , 1H
 , OE2V 가 , (17b)(1 가 (17b))
 ,
 (16) , (11b)
 , 150 (11b) , 3
 , 150 5
 , 115 126 , 1 1
 15 (19)가 , 1 (19)
 19) (11b)
 , 38 (19) (11d) , 38
 43 , (11e) (11e) , (11d)
 , (19)
 51 , (19a) (11b) , (11e)
 , 50 가 , 63 (631)
 가 , 63 (19) (11b)
 , EL (15) , (11b)
 ,
 1, 38 (12a) , (19) 가 , 138
 1 (16)
 138 , (17a)(1) (1) (17a) (17a) (17a)(3)
 (17a)(2) (1) (2) (17a) (18)
 (2) (3) (17a) (11a)
 가 ()
 G (17a) (1) → (2) → (3) → (4) → (5) → (1) → (2) →
 ,
 1 (1) , (11b) G- S
 (1381) (17a) Vgh() Vgl() (11a)
 (17a) Vgl() Vgh() (1381) (11a)
 G ((19)) (11a) (1381)
 ()
 (19) (1381)
 , (19)
 ,
 , A B A (17a)(2) Vgh Vgl
 . B (17a)(2) Vgl Vgh (138)
 A (17a) (Vgh() Vgl() (11a)
 a) G 가 , (11b, 11c)가 , (18) ()
 (16) , (19)가 () (19) () (11a)가
 가 , C (11a)가 1H
 B (17a) (Vgl() Vgh()
 가 Vgh((11a) G 가 (Vc) (17a)
) (11b) (11c)가 , (19)

(18) Vc .

, , Vb Vc .

EL (15) .

139 , 138 가 .

, .

가 1 (11a) , (17a) (Vgl() Vgh() ,

() (17a) Vgl() Vgh() ,

(11a) Vdd .

Vdd , (11a) P , 가 가 .

, N , 138 ,

, , (11a) P ,

, WR (17a) (Vgl) ,

(18) 가 (16) (11a) (18) (16) , WR (

(17a)) (Vgh) (11c)(1) P , 111

, (11b), (12) P ,

, 가 EL (15) (11d)가 P

Vgh) , N , (11d) G가 (

D 가, (2H) (11b) (11a)

, 1 138 .

, 139 , (12a)

OEV1 가 (116) , OEV1 H 가 ,

(17a) Vgh 가 . Vgh 가 (11b, 11c)(1))

OEV1 1H 1 , H 가 , (17a) Vgh() ,

(17a) (Vgl) 가 (Vgh) , OEV1 H 가

Vgh() .

OEV1 H 가 , (17a) (Vgh) 가 (14

) (1) , (18) (16)

Vdd (11a), (11c) 가

, (14)가 (17a)

, 가 (14) (18)

, (18)

138 , (17a) (1381)

(19) () , .

OEV1 (18) , (1381) ,

(19) . 139 .

139 , OEV1 (17a) (: Vgl) 가

(1H) t1 (t1 OEV1 H 가) t1

, 1H가 , 1H t2 , 1H =t3+t1+t2 .

, t3 , 1H =t3+t1+t2 .

139 (17a)(2) (1) (17a)(1) (1) (17a) (17a) (17a)(3)
 (2) (3) (2) (17a) (17a) (18)
 가 () (17a) (3) (11a)
 G (17a) (1) → (2) → (3) → (4) → (5) → (1) → (2) →
 (3) , 1 (3) 1H
 , 2H () 3 H (17a)(3) (Vgl)
 가 (3) (11b, 11c)가
 139 A (17a) (Vgh() Vgl() , (18)
 (11a) 가 (11b, 11c)가 (19)가 () (19) () ,
 () (16) , (19)가 () Vb () 1H
 (11a)가 가 , C (11a)가
 B , Va (Va 142
 (a)) . C (17a) (Vgl() Vgh()
 (11a) 가 (3) Vd
) . (17a) 가 Vgh() (11b) (11c)가 Vd
 (19) (18) , t1
 t1 , (18) , (14)가
 2 (b) 가 , t1 (17a)(3) Vc (14
 1c)가) . , t2 (18) 가 가 (11b, 1
 (3) Vc (11b, 11c) , (19)
 , t2 (3) Vb
 , t2 , Vc Vb
 (0.5 μ sec , t2 0.5 μ sec 5 μ sec) . , t1
 0.5 μ sec 10 μ sec 가
 E (17a)(3) (Vgl() Vgh()
 (11a) 가 (Va) . (17a)
 가 Vgh() (11b) (11c)가 (19)
 (18) Va Va
 (3) ()
 139 , (Vgh Vgl (1381), (19)
 (, (11a)) .
 . OEVI H 가 가 ,
 (14)가 가 , (18)
 가 , (18) 가
 , (17a) 가
 , OEVI (17a)
 , 가
 (18) OEVI 가 H , OEVI
 , (17a) 가 OEVI
 H , 가

$$B/A = \frac{t_1}{t_2} \quad (17a)$$

$$B/A = 0.02 \quad (17b)$$

$$B/A = 0.3 \quad (17c)$$

$$B/A = 0.05 \quad (17d)$$

$$B/A = 0.1 \quad (17e)$$

$$B/A = 0.2 \quad (17f)$$

$$B/A = 0.4 \quad (17g)$$

$$B/A = 0.6 \quad (17h)$$

$$B/A = 0.8 \quad (17i)$$

$$B/A = 1.0 \quad (17j)$$

$$B/A = 1.2 \quad (17k)$$

$$B/A = 1.4 \quad (17l)$$

$$B/A = 1.6 \quad (17m)$$

$$B/A = 1.8 \quad (17n)$$

$$B/A = 2.0 \quad (17o)$$

$$B/A = 2.2 \quad (17p)$$

$$B/A = 2.4 \quad (17q)$$

$$B/A = 2.6 \quad (17r)$$

$$B/A = 2.8 \quad (17s)$$

$$B/A = 3.0 \quad (17t)$$

$$B/A = 3.2 \quad (17u)$$

$$B/A = 3.4 \quad (17v)$$

$$B/A = 3.6 \quad (17w)$$

$$B/A = 3.8 \quad (17x)$$

$$B/A = 4.0 \quad (17y)$$

$$B/A = 4.2 \quad (17z)$$

$$B/A = 4.4 \quad (18a)$$

$$B/A = 4.6 \quad (18b)$$

$$B/A = 4.8 \quad (18c)$$

$$B/A = 5.0 \quad (18d)$$

$$B/A = 5.2 \quad (18e)$$

$$B/A = 5.4 \quad (18f)$$

$$B/A = 5.6 \quad (18g)$$

$$B/A = 5.8 \quad (18h)$$

$$B/A = 6.0 \quad (18i)$$

$$B/A = 6.2 \quad (18j)$$

$$B/A = 6.4 \quad (18k)$$

$$B/A = 6.6 \quad (18l)$$

$$B/A = 6.8 \quad (18m)$$

$$B/A = 7.0 \quad (18n)$$

$$B/A = 7.2 \quad (18o)$$

$$B/A = 7.4 \quad (18p)$$

$$B/A = 7.6 \quad (18q)$$

$$B/A = 7.8 \quad (18r)$$

$$B/A = 8.0 \quad (18s)$$

$$B/A = 8.2 \quad (18t)$$

$$B/A = 8.4 \quad (18u)$$

$$B/A = 8.6 \quad (18v)$$

$$B/A = 8.8 \quad (18w)$$

$$B/A = 9.0 \quad (18x)$$

$$B/A = 9.2 \quad (18y)$$

$$B/A = 9.4 \quad (18z)$$

$$B/A = 9.6 \quad (19a)$$

$$B/A = 9.8 \quad (19b)$$

$$B/A = 10.0 \quad (19c)$$

$$B/A = 10.2 \quad (19d)$$

$$B/A = 10.4 \quad (19e)$$

$$B/A = 10.6 \quad (19f)$$

$$B/A = 10.8 \quad (19g)$$

$$B/A = 11.0 \quad (19h)$$

$$B/A = 11.2 \quad (19i)$$

$$B/A = 11.4 \quad (19j)$$

$$B/A = 11.6 \quad (19k)$$

$$B/A = 11.8 \quad (19l)$$

$$B/A = 12.0 \quad (19m)$$

$$B/A = 12.2 \quad (19n)$$

$$B/A = 12.4 \quad (19o)$$

$$B/A = 12.6 \quad (19p)$$

$$B/A = 12.8 \quad (19q)$$

$$B/A = 13.0 \quad (19r)$$

$$B/A = 13.2 \quad (19s)$$

$$B/A = 13.4 \quad (19t)$$

$$B/A = 13.6 \quad (19u)$$

$$B/A = 13.8 \quad (19v)$$

$$B/A = 14.0 \quad (19w)$$

$$B/A = 14.2 \quad (19x)$$

$$B/A = 14.4 \quad (19y)$$

$$B/A = 14.6 \quad (19z)$$

$$B/A = 14.8 \quad (20a)$$

$$B/A = 15.0 \quad (20b)$$

$$B/A = 15.2 \quad (20c)$$

$$B/A = 15.4 \quad (20d)$$

$$B/A = 15.6 \quad (20e)$$

$$B/A = 15.8 \quad (20f)$$

$$B/A = 16.0 \quad (20g)$$

$$B/A = 16.2 \quad (20h)$$

$$B/A = 16.4 \quad (20i)$$

$$B/A = 16.6 \quad (20j)$$

$$B/A = 16.8 \quad (20k)$$

$$B/A = 17.0 \quad (20l)$$

$$B/A = 17.2 \quad (20m)$$

$$B/A = 17.4 \quad (20n)$$

$$B/A = 17.6 \quad (20o)$$

$$B/A = 17.8 \quad (20p)$$

$$B/A = 18.0 \quad (20q)$$

$$B/A = 18.2 \quad (20r)$$

$$B/A = 18.4 \quad (20s)$$

$$B/A = 18.6 \quad (20t)$$

$$B/A = 18.8 \quad (20u)$$

$$B/A = 19.0 \quad (20v)$$

$$B/A = 19.2 \quad (20w)$$

$$B/A = 19.4 \quad (20x)$$

$$B/A = 19.6 \quad (20y)$$

$$B/A = 19.8 \quad (20z)$$

$$B/A = 20.0 \quad (21a)$$

$$B/A = 20.2 \quad (21b)$$

$$B/A = 20.4 \quad (21c)$$

$$B/A = 20.6 \quad (21d)$$

$$B/A = 20.8 \quad (21e)$$

$$B/A = 21.0 \quad (21f)$$

$$B/A = 21.2 \quad (21g)$$

$$B/A = 21.4 \quad (21h)$$

$$B/A = 21.6 \quad (21i)$$

$$B/A = 21.8 \quad (21j)$$

$$B/A = 22.0 \quad (21k)$$

$$B/A = 22.2 \quad (21l)$$

$$B/A = 22.4 \quad (21m)$$

$$B/A = 22.6 \quad (21n)$$

$$B/A = 22.8 \quad (21o)$$

$$B/A = 23.0 \quad (21p)$$

$$B/A = 23.2 \quad (21q)$$

$$B/A = 23.4 \quad (21r)$$

$$B/A = 23.6 \quad (21s)$$

$$B/A = 23.8 \quad (21t)$$

$$B/A = 24.0 \quad (21u)$$

$$B/A = 24.2 \quad (21v)$$

$$B/A = 24.4 \quad (21w)$$

$$B/A = 24.6 \quad (21x)$$

$$B/A = 24.8 \quad (21y)$$

$$B/A = 25.0 \quad (21z)$$

$$B/A = 25.2 \quad (22a)$$

$$B/A = 25.4 \quad (22b)$$

$$B/A = 25.6 \quad (22c)$$

$$B/A = 25.8 \$$

C, (1433) 가, 가 V_{sh} V_{s1} , 가
 (18) () (2) V_c . C (17
 a)(2) 가, V_c . C D

D, (17a)(2) ()
 2) V_b (18) V_b (16) .
 (18) ,

139 OEV1, (18) (18)
 , (14) (14) , 147
 , (18) (1471) (1461) (752)가
 (146) . (14) (1472) .

(752)가 , 147 (a) , lw가 (1461)
 (752)가 (147 (b)) , (1461)
 lw (1472) (1473) 가 ,
 , (752) (147 (c)), lw (1472)
 (18) 가 (18) (16
)

139 C D , 139 , (18) (18) (16
)

143 (1433) , (18) 가 . 1
 51 ,

151 (19) (11a) , (1511)
 (1511) 1 (1511)
 (1512) (1512) 152 ,
 (1511) 가 , 1 가 .

152 , (17a)(1) (1) (17a) (17a)
 (17a)(2) (1) (2) (17a) (17a)(3)
 (2) (3) (17a) .

(1) (1) (1511) (2) (2)
 (1511) , (3) (3) (1511)

(18) 가 () (2) , (2)
 ((11a) G (17a) (1)-(2)→(
 3)→(4)→(5)→.....(1)→(2)→.....
 (2)..... (1511) (1)→(2)→(3)→(4)→(5)→.....(1)→
 (2)..... (2) ((11a) G
) , (16) 가 .

A (17a) (V_{gh} () V_{gl} () , ()
 11a) G 가 (V_a+V_c). , (11b, 11c)가 , (18)
 () (16) (19) () , 1H , (1511)
 V_{cl} ($V_{cl}<V_{ch}$).

1H Ta , (1511) 가, V_{cl} V_{ch} (152 B) .
 , 1H (1511) ,
 (19) ((2)) , V_e (11b, 11c)가 , (1
 8) () (16) (19)가 () , 1H C , V_b
 (16) , Ta 0(1H) sec , Ta 0 1
 H 1/5 . Ta .

C , (17a) (V_{gl} () V_{gh} () , 가,

가 C, (1381) (17a) (2) 가 Vgh((18) , (11b) (2) Vd (11c)
(19) Vd

1H ((2)) Tb (1511) (1511) 가, Vch Vcl
(152 D) (1511) (19) (2)) 가
, Vb (11a) , Vb가 (19) ,

가 Ta (1381) (16) (1511) Vch Vcl (1511) 가
c(1H) , 1H (1511) , Tb 0 se

(, 가 Vcl Vch
(, Vcl Vch Vcl) ,
(, Vch Vcl) ,

(1511) (Vch, Vcl) , () (12) 가
(1512) , 139 가

151, 152 , (17a) 153 (151
2) ,

153 (19) (11a) ()
(17a) (19) (17a) , 1,
151 가

154 , (17a)(1) (1) (17a) (17a)
(17a)(2) (1) (2) (17a) (17a)(3)
(2) (3) (17a)

(18) 가 () (2) , (2)
((11a) G (17a) (1) → (2) →
(3) → (4) → (5) →(1) → (2) →

(2) ((11a) G 153)
(16) , 가 (17a) 가
(12a) (Vgl) 2 (Vgh2, Vghl)
Vgh2> Vgh1 , 0.02(V)<Vgh2-Vgh1<0.4(V)

A (17a)(1) (Vghl() Vgl() , (2)
) (19) 가 (Ve Vd). (11a)
G 가

B , (2) (17a)(2) (Vghl() Vgl() ,
가 (11b, 11c)가 (18) () (16)
, (19) () 1H Vb ,
(19) , 가 (11a)

C , (17a)(2) (Vgl() Vgh2() , 가,
(1381) (2) (11b) (2) Vc
. C (17a) 가 Vgh((18) Vc (11c)가
(19)

1H ((2)) 1H (154 D), (17a)(2) 가,

Vgh2 (Vgh1 (152 D). (17a)(2) , (19)
 ((2)) 가 , Vb (11a) , Vb가 .. (19) ,
 (1381) , (17a) 3
 (Vgh1, Vgh2, Vgl) 가 (16)
 , 1H (154 D) , (17a)(2) Vgh2 , 1H
 Vgh1 (155 D) , 155 , 1H
 Ta (155 D) , 153 (17a) (19)
 , 156 (17a) (19)
 , 157 (17a) (19)
 A (3) (19) 가 (17a)(1) (Vgh1() Vgl() , (11a)
 G 가 (Va Ve) .
 B (3) (19) 가 (17a)(1) (Vgl() Vgh2() , (11a)
 G 가 (Ve Va) .
 C (19) 가 (17a)(3) (Vgh1() Vgl() , (3) (16)
 (19) () (11b, 11c)가 , (18) ()
 , (19) () 1H , Vc
 , (19) 가 (11a)
 D , (17a)(3) (Vgl() Vgh2() , (3) 가,
 (1381) (3) , (3) Vb
 (11c)가 . C , (17a) 가 Vgh() , (11b)
 (19) (18) Vb
 1H ((3)) 1H (157 D), (17a)(3) 가,
 Vgh2 (Vgh1 (157 D) . (17a)(3) , (19)
 ((3)) 가 , Vc (11a) , Vc , (19) ,
 (1381) (17a) 3
 (Vgh1, Vgh2, Vgl) 가 (16)
 , (16)
 (11bn) N (11bn) 146 1 P (11b) , P (11bn) N
 (11bn) , (1481)
 148 , (11b) P N 가
 가 (17a) , (11bn)
 , 149 ,
 , 148, 149 , 139
 , (17a)(WR) (17b)(EL
) , (17b)(EL) , EL (15)
 , 63 , (631) , EL (15)

(17b)(EL) , EL (15)
 (17b)(EL)
)
 15, 18, 21 (17b)(EL) 1 (1H) , 가
 (Vgl), (Vgh) 가 , EL (15) , 가
 , 1H
 158 1/4 duty 4H 1H 가 (17b)(EL) 가
 , (HD) , 가 1H
 , 161 1H (161 1/2H)
 , 1H , 1H
 (12b)((17b))
 . OEV2 OEV1 가 OEV2
 159 (17b)(EL) 1H (弱) 가 (17b)(EL)
 (17b)(EL) 1H 가 (17b)(EL) T2
 가 T1 (17b)(EL) 가
 1H 159 1
 1 2 (17b)(EL) 1H 가 , (17
 가 (17b)(EL) 가 T1 (17
 b)(EL)) 가 T2 1H
 , EL (17b)(EL) 가
 , EL (15)
 160 (17b)(EL) 1.5H , A (1
 7b)(EL)) (17b)(EL) 가
 (18) (18) ()
 가 (11a)
 160 , A (17b)(EL) (1) (Vgl) 가
 (Vgh) 가 (17b)(EL) (2) (Vgh) 가
 (Vgl) 가 , A (17b)(EL) (1)
 (17b)(EL) (2) (18) (17b)(EL)
) () 가 (18)
 , ()
 , 160 1.5H , 162
 , 가 1H
 (17b)(EL) 가 (50)
 (a) 163 (b) OEV2 가 163 (b) 163 (c) 163
 , 164 , 1H 가 가
 164 (a) 6 164 (b) 3 164 (c) 1
 164 (b) 164 (b) 가 164
 (b) 164 (c) 가 , 164
 ()

98 (a) (52) (53) 98 (b)

(c) (52) (53)

() (52) (53)

98 (a), (b), (c)

184 IC()(14) 184

3 (1841, 1842, 1843)

184 1 (1841) N (, N) 2 (1842)

2 (1842) M (, M) 3 (1843)

1 (1841) N×M 3

(1843)

QCIF (18) IC(14) 176 (

RGB 176) N 16 M=1

16×11=176 176 , N M 8 16

IC 가

1 2 (1841) N×M 3 (1843) IC()(14)

2 (1842) 가

1 ((1841)) 2 ((1842))

1 (1841) 3 (1843)(, (1841)) 3 2 (

) 1 2 (1843) 가 1 (1841) 3 (

1843)

(14) 1 ((1841)) 2

((1842)) 2 ((1842)) 3 2 (

((1842)) 가 , 1 ((1841)) 2

((1842)) 1

((1843)) 2 ((1842)) 3

((1843))

1 ((1841)), 2 ((1842)), 3

((1843))

(가).

(1841, 1842, 1843)

185 IC()(14) 185 3 (1843)

(18) (1854)(1)) 가

가

IC()(14) MOS

185 , 6 , 2 6

, 64 IC(14) , (R), (G), (B) 64
, 64×64×64= 26 .

64 , D0 (1854) 4 , D3 (1854) 32 , D1 (1854) 8 , D4 (1854) 63 2 , D2 (1854) 1
6 , D5 (, 64) - (1854) 1 () . ,
가 가
가 ().

185 , D0 LSB (1851a)(, D5 MSB . D0 H (N
) , (1851a)()가 , P
(1)(1854) 가 . IC(14) (1853) (1853)
IC(14) (18) , (1853) 가 (1
6)

2 , D1 H () , (1851b)가 ,
2 (1)(1854) 가 . IC(14) (1853)
(1853) IC(14) (18) (1853)
가 (16)

(1851) 가 . D2 H () , (1851c)가
4 (1)(1854) 가 , D5 H
(1851f)가 . , 32 (1
)(1854) 가 .

, (D0 D5) (1) 가 (1) 가 .
, 0 63 (1) 가 .

, 255 (1854) 6 63 , 8
(1854) () . , 4 , 15 .
(1854) W, L

, (1854) 가, , 1 (1854) , 2 (1854) , 4
(1854) 가 , 1 (1854) 가
, 가 가 , 가
, 1 , 가

(1854) 가 . 가
(1854) , L W 가
, W=3μm, L=4μm , (1854) W, W×L=12 μm .
가 가

(1854) N . P , N
, 1.5 .

IC(14) (1854) , N
IC(14) (16) IC (16)
(11a) P , 1 (11d) P .

, IC() (14) (1854) N ,

(16) (11a) P (11) ((11a, 11b, 11c, 11d)) P N

(1854) IC(14) (14) (1854) N

(16) (11) P (11) (12) P (12) P (1854) N

(71) (14) (14) (71) IC(14)(

(14) (71)

(12) P (Vgh) () (16)

(11a, 11b, 11c) P

(14)

(71)

(14) (71) (18)

TAB (14) (14) (18)

가 가 (14)

(16) P P

EL ()

FED()

(16) Vgl (16)가 (11b, 11c)가 P , Vgh (16)가 (Vgh)가 (16)가 (17a) (Vgl) (11a)가 P 가

(12) P Vgh , P

(16) Vdd (11a), (18)

(14) (1854) lw가 (14)

(12) (16) P (1854) N (1854) P (1854) (1854)

(W · L) (1854) , N (1854)

P IC(14) (1854) N , 1/1.5 1/2

186 , 3 176 (N×M=176) 186 , 1

(1841) , 2 (1842) , 3

(1843) , 176 가

1 (1841) 2 (1842) 8mm (

가 , 2 (1842) 3 (1843)((Vt, (μ)) 가 8mm

, 5mm

(I) (1841)() (I+1) (1842a)() (1841a)() (I+1)

188 (1842b)() (1841) 1 (491)

186, 187 (1841) (1854) (1854)

가 (1842a) (1842a) (1841) (1842a)

(1842a) (1841) (1842a)

(1841) 1 (1842a) (1841) (1842a)

189 (1843a) (1843b) (1843a) (1843b) (1843a) (1843b)

(1843ba) (1843a) (1843b) (1843)

(1843)

189 (1842a, 1842b) 185 (1843b)

IC(14) IC(14) (1854)

CMOS, FET, CMOS, DMOS (1854) CMOS

(1854) N P 1.5 N

IC(14) (1854) N IC (16) (11a) P (11d) P (16)

(16) IC() (14) (1854) N (11a, 11b, 11c, 11d) P

(16) (11a) P (11)

(1854) IC(14) (14) (1854) N

188 187 187, 188 (1841) 1

N (1842a) 2 N (1842b) 2 P

188 (1841a) 1 N (1842a) 2 N (1

842b) 2 P .

187 ,가 (491)(, 2 N (1842a) (1841) 1

, 188 ,가 (491) N (1841a) 1 , 2
2 P N (1842a) 가 , 2
(1842b) , .

, , , 1 2
, () , 2 3 , 2

187 N (1841) 2 N (1842a)가 (1
) , , 1
2 , .

, 188 N (1841a) 2 N (1842a)가 (2
1) , , 1

(IC)(14) , , (

, , 1 2 , 2 3 , 3
4 , ... , 1

189 186 3 (3) ,
(, 186).

189 , ,가 (491) N (1841) 가 , ,가 (491)
(1841) IC()(14) ()
(1) (1854) , 185 (1841)

(1841) 1 , 2 2 N (1842a)
가 , (1842b) (1843a)
, 2 , 3 P N (1843b) (185
3 가 N (1843b) 185 N
4)가 () .

, (12)
(14) IC (14) 가 IC (71)
, IC(14) IC ()

83 (832) , IC(14) (835) IC
(832) , IC(14)

IC(14) (833) (833) (834)
) (834) QCIF , 176×RGB=528 (834) ,

1, Vdd () , (834) , EL (15)가
 200 μ A 가 , (833) , 200 μ A $\times$ 528 100mA
 가 .
 , (833) 0.2(V) , 가
 2 Ω (100mA) 가 .
 (835) IC (14) () . , EL (15)가
 (835) IC(14) , .
 (835) , 가 .
 (835) , ITO (835)
 IC (14) ((71)) . ,
 (835) , 가 (71) . ,
 (835) , (835) ,
 .
 (71) IC (14) , () , ()
) , () , ()
 . , (71) IC (14) , ,
 , 가 ,
 (835)
 () .
 (835) (71) (, /
 , IC (14) . , (71)
 (835) , (71) (835)(,
) , IC(14)
 , (71) .
 , 83 , (71) , IC (14)
 . , IC (14) () ,
 .
 (14)가 (71) (, (71)
 , , (14) () . , (71)
 ,
 IC (14) (1461) , 가 (146).
 () . , EL , (71) (EL (15)
 (50) , IC (14)
 (1461) , EL
 .
 , (835) (71) , (835)
 83 , (1461) . (835) EL , (835)
 835)) , 가 , 1H (835)
 , () .
 ,
 (832) , (834) , 84 ,
 (50) (832a) , (50) (832b) ,
 (834) .

(50) (50a) (50b) (50a)

(14a) (50b) (14b)

EL (71) EL (15) (50)

() (70) (1011b)) (85) (85)

가

PrMnO₃

94 942 (945a 954b) 가 , 1 가
(946) (946) 2 (941) 1 (943) Vpc가 가 , 1 가
(946) 2 . (943) , (944)

Vdd 945 b Vss Vss 95
2 -9(V)가 (951) 95

(951) (952) 가 , Vss , -9(V)
L (15) , -6(V) 95 , 2 , EL (15) , Vss E
() , Vdd 가 , 3 Vss , Vss

95 , Vss Vss=-6(V)
(951) 96 Vss
96 (941) Vdd 가

97 IC(14) GND IC(14) V
cc Vcc (Vdd) , Vcc<Vdd

(12) Vgh , Vdd , Vdd+0.5(V)<Vgh<Vdd+2.
5(V) Vgl Vss , Vss(V)<Vgl<-0.5(V)

EL 99 EL EL

(991)

100 (71a) (71b) (107)가 (71b) EL (101).
(71a) (71b)

(1001) ACF (14) (71a) (18),
(1001) (71b) (18)

(1004) (1004) (71) (1003)가
(1003) (1004) (71) (1004)

가 , 가

(1004) EL (15)

101 (71a) (71b) (1011) (1011)
(71a) (71b)

102 (1021) (1023)
IC(14) (12) , (1022) IC

IC(1022) IC(14)

(14)

103 (1031)가 (1021) I
C(1022) IC(1022) / (1032),
(1033)

104 IC(1022)가 DATA,
ID CLK , (RDATA(), GDATA(), BDATA(
K), (UD), EL (ELCNTL), WR (WRCNTL)

108 ID H , DATA가 , L ,
DATA가 , 110 CLK LVDS 109 ID

105 105 (a) , 105 (b) AA'
(1051) (111) (1051) (11) , EL
(15) 가 (1052) (1052)

106 (1062) (1061) (106
2) (1021) (71) (1062)

(1062) (71) (111) 가 (1062)
((1063)가 (106 (a). (1063) , ,
(1063) 106 (b) (71) , (71)
107 (573) (71) (573) (

71) (1063)

57
(573) (571), (572) (572)

(572) 8 , (572) 4096 , (572)
26 , (572) 3 ()

(572) , 4096 , , 「 4096
「 「 (50)

(21)

(572)

57
CD (50) CCD (50) 24 (1670) CCD (18) (26) (16) (6.5)

58

(573) , EL () (574)
 (573)
 ($\lambda/4$) (108), (109) 10, 11
 (581) (582)가 (581) (573) 가
 , (574) (50) 가

(574) (583) (582)

59
,
가
EL
(50)
(593)
(592)
(573)
(574)
(50)
(591)
(573)

(594) . (594)

(594) . (594)

4, N=1, 1.5, 2, 3, 4, 5, 6, EL (15), 1/M, 4, EL (15)가

가 (50) 가

EL (15)

가 (594) 가 50%, 60%, 80

%

, (50) 가 . 가 , 가 , 가
 , 가 70% , 가 , 50%
 EL (15) , 1F 1/M) , N (N , 가
 , M , M ,
 (12) , (0.9) 50%
 , 100% , 100% 20% 가 가 (0.9) 70%
 , 100% 15% 가 가 .
 , 가 , 가 , -가 ,
 가 , 가 , 50%, 60%, 80%
 , 가 , 가
 . 가
 , 60 Hz 가 , EL (15)가 60Hz 가 ,
 , , 가 , N (N EL (15)
 , 1F 1/M) , N M ,
 (594) . (594) (50) ,
 ,
 , 가 , ,
 , 가
 EL (601) (50) 60 (601) (603)
 , (594)가 .
 , 30 (50)
 (611) , 61 (614) (614) (611) ,
 , 가 , (613)
 , (612)
 (612) A , (612) B
 ,
 61 , ()
 가 , AIR 가 ,
 가 () 가
 ,
 ,
 ,
 ,

가 . , 가

(), (), (), (), PVA
()
0.5mm 2.0mm 가 가 , 가

가 .

, 3 3
가

가 가 , N ,

N (13, 16, 19, 20, 22, 24, 30)
(11) (11)

(11) , 가
(, 22, 24, 30 N
).

, PHS,

, 가 가

가
RGB , RGB

EL . RGB

EL . EL () RGB

가,
, R, G, B 가

가

(57)

1.

EL ,

EL ,

EL 1 ,

1 ,

,

P ,

N ,

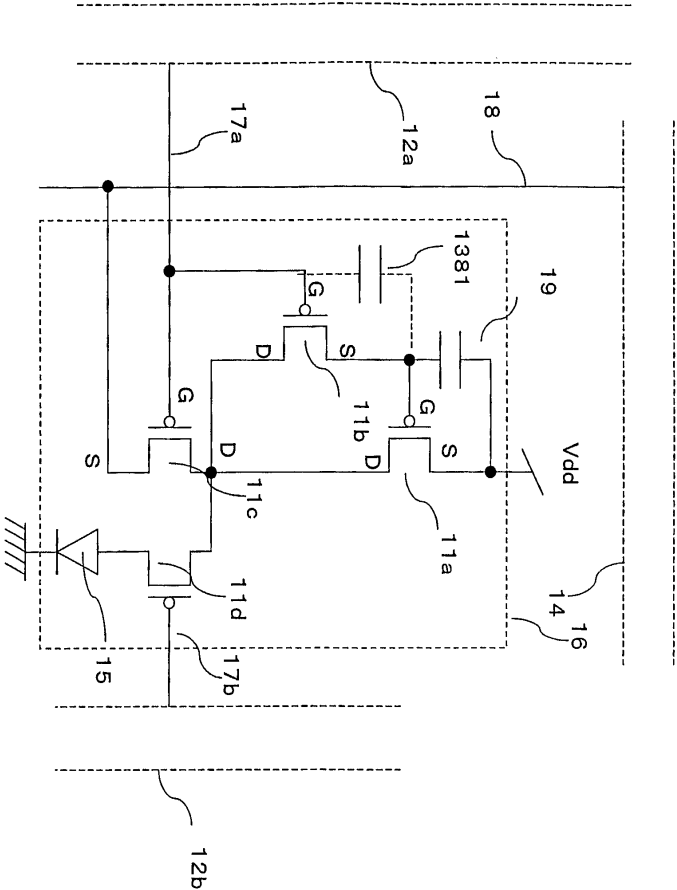
EL , 1 , 1 1 ,

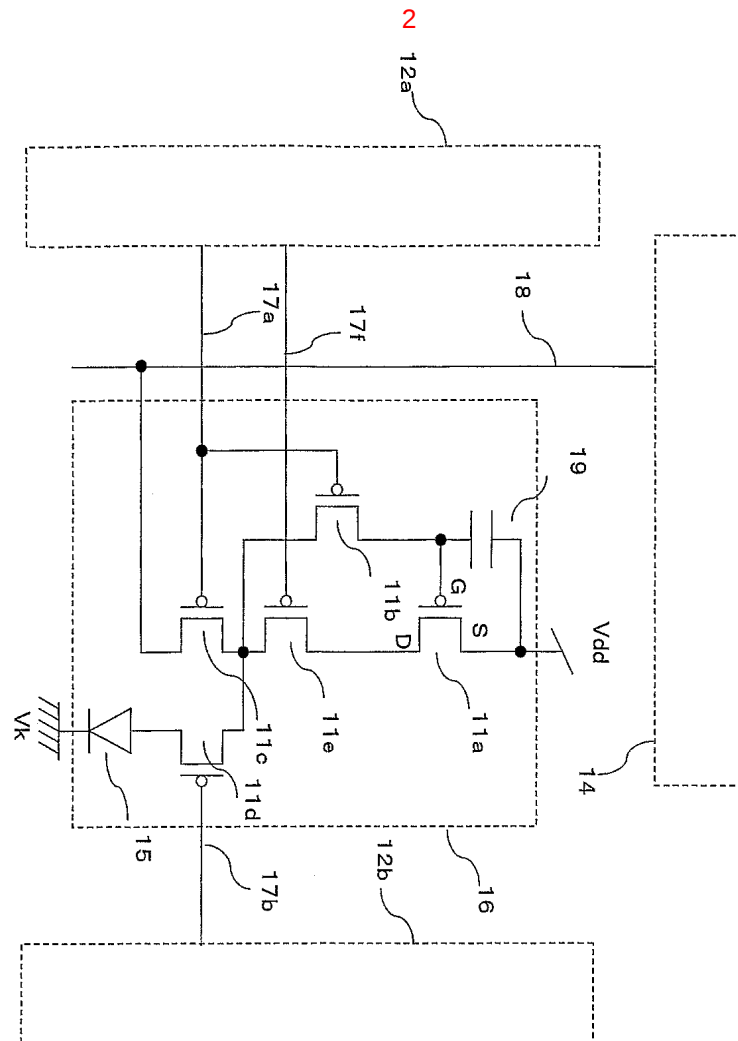
2.

1 ,

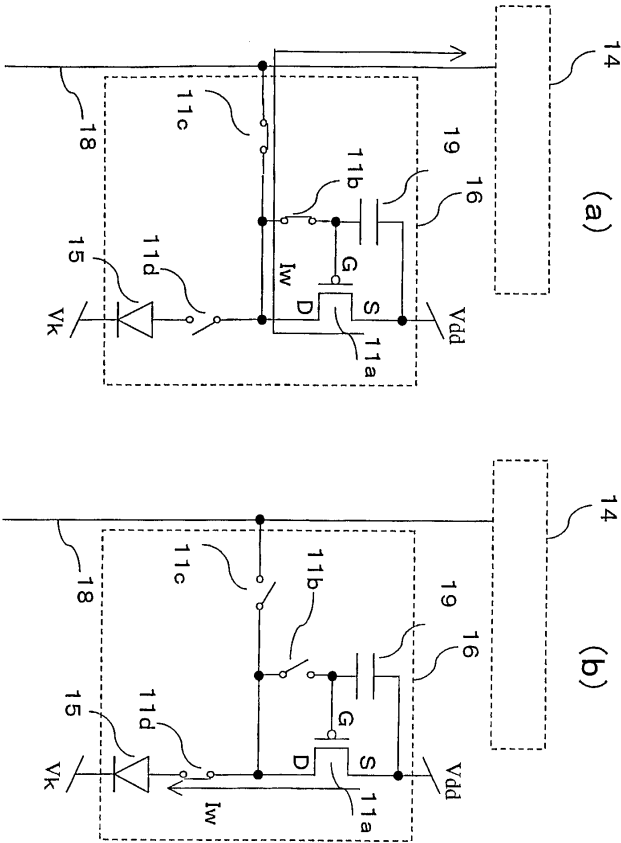
1 , 1 1 , EL

1

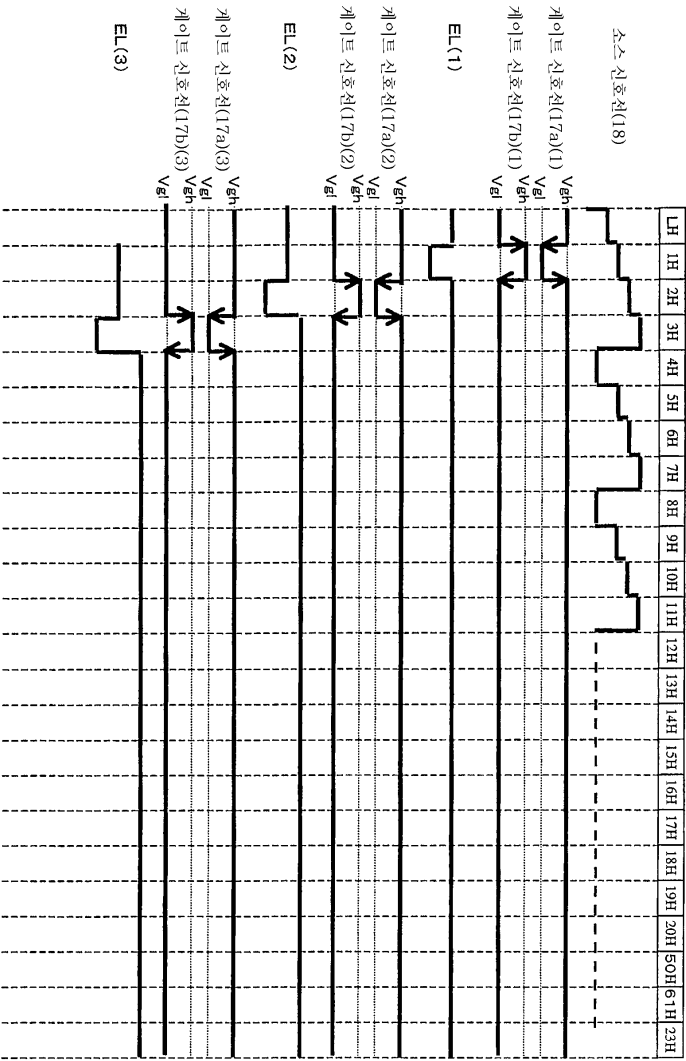


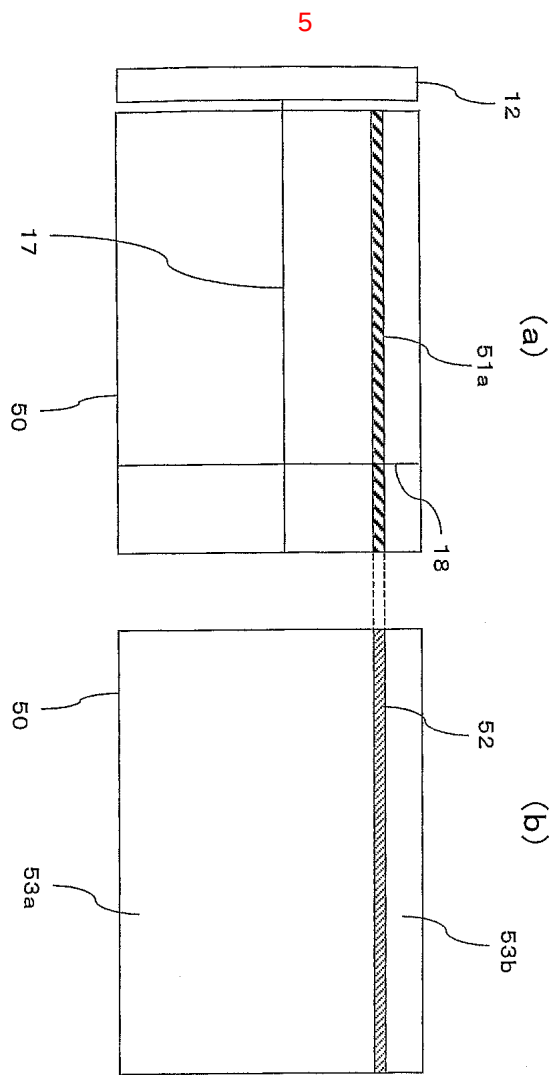


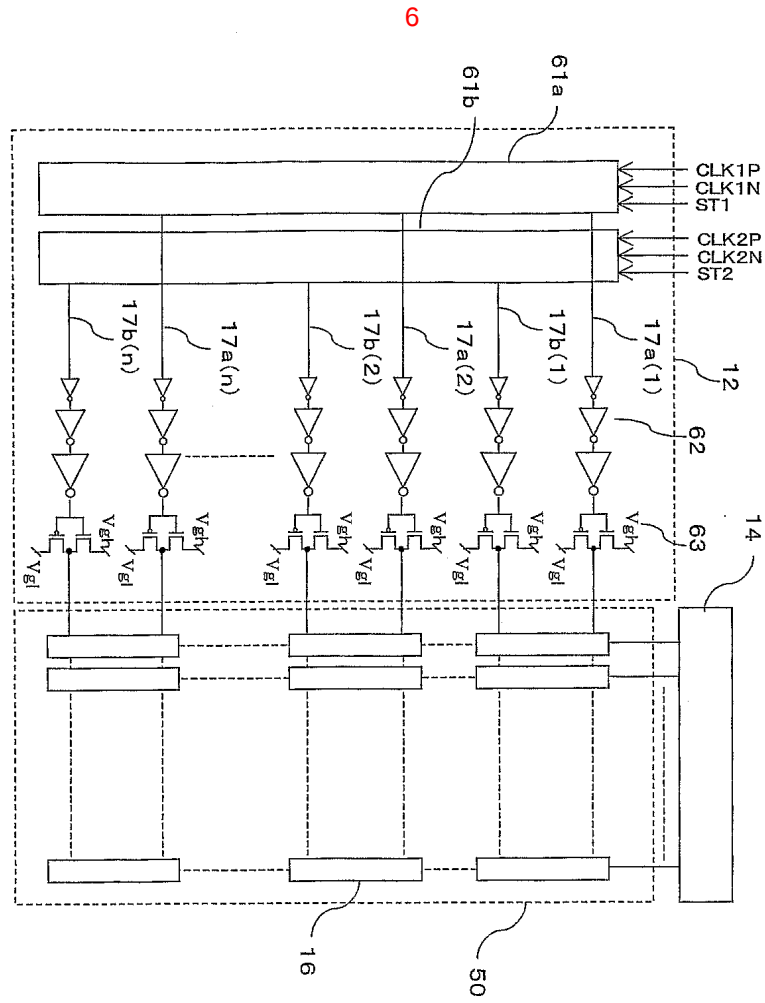
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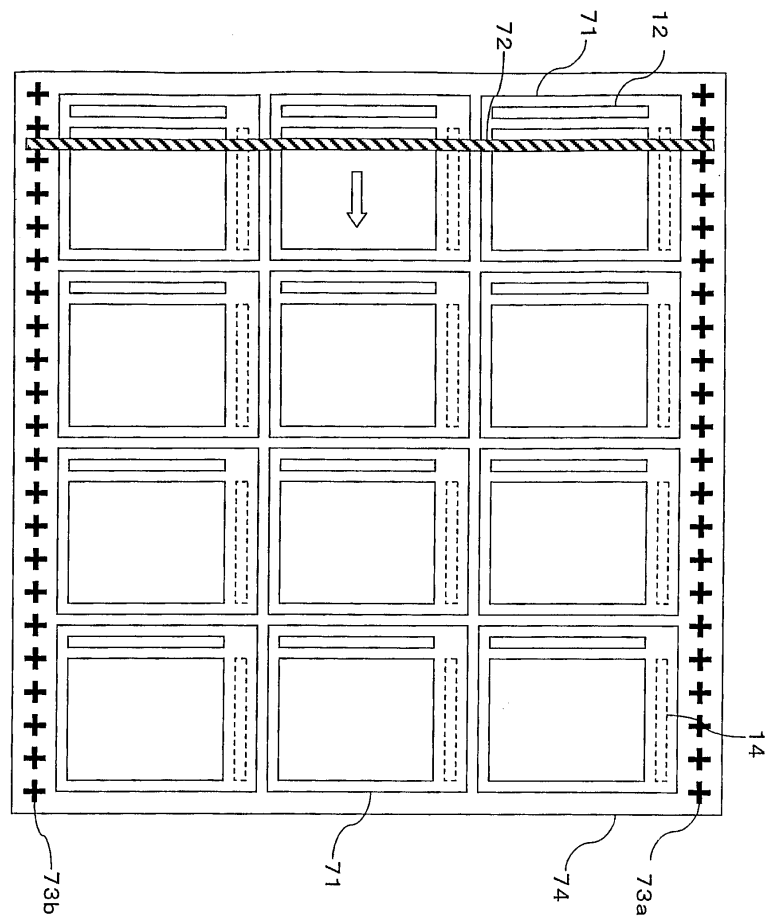
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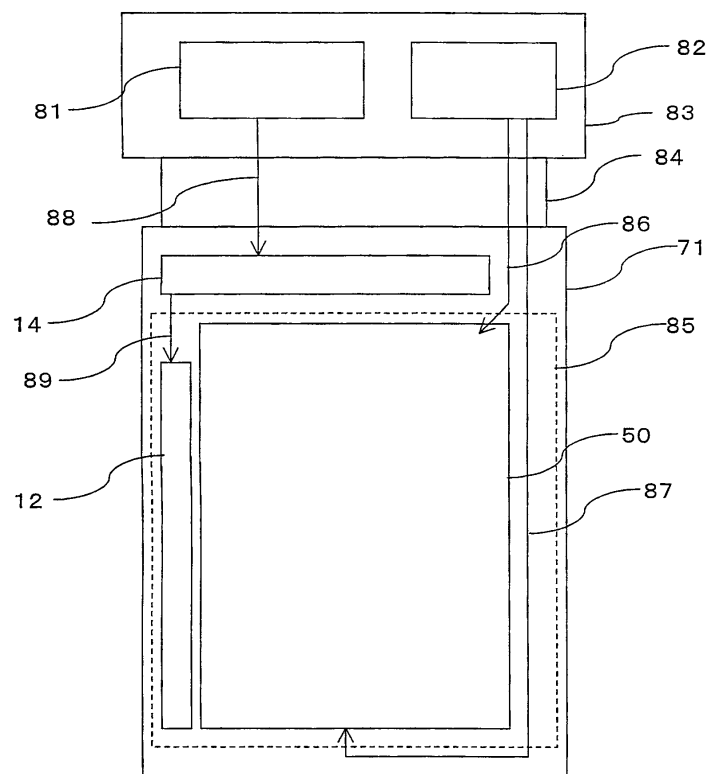




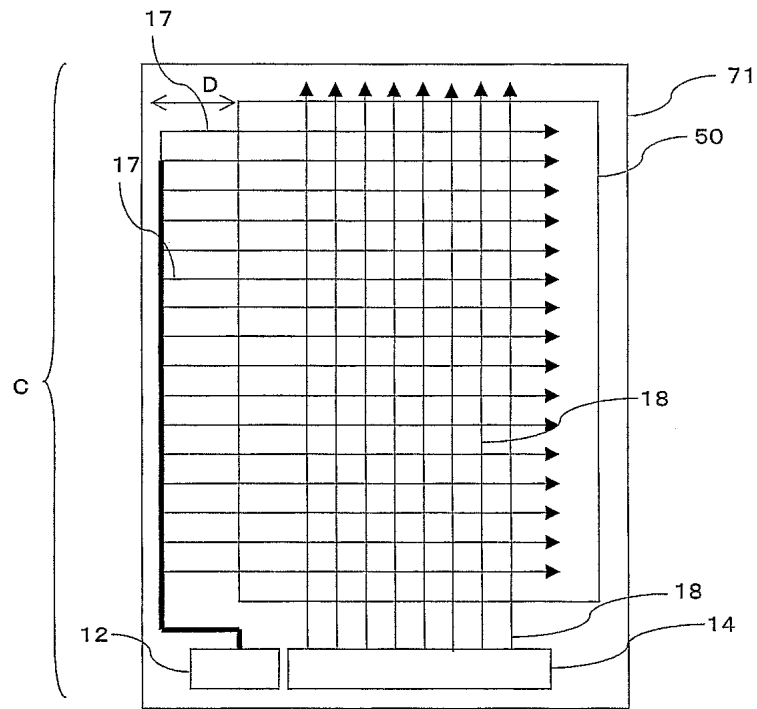
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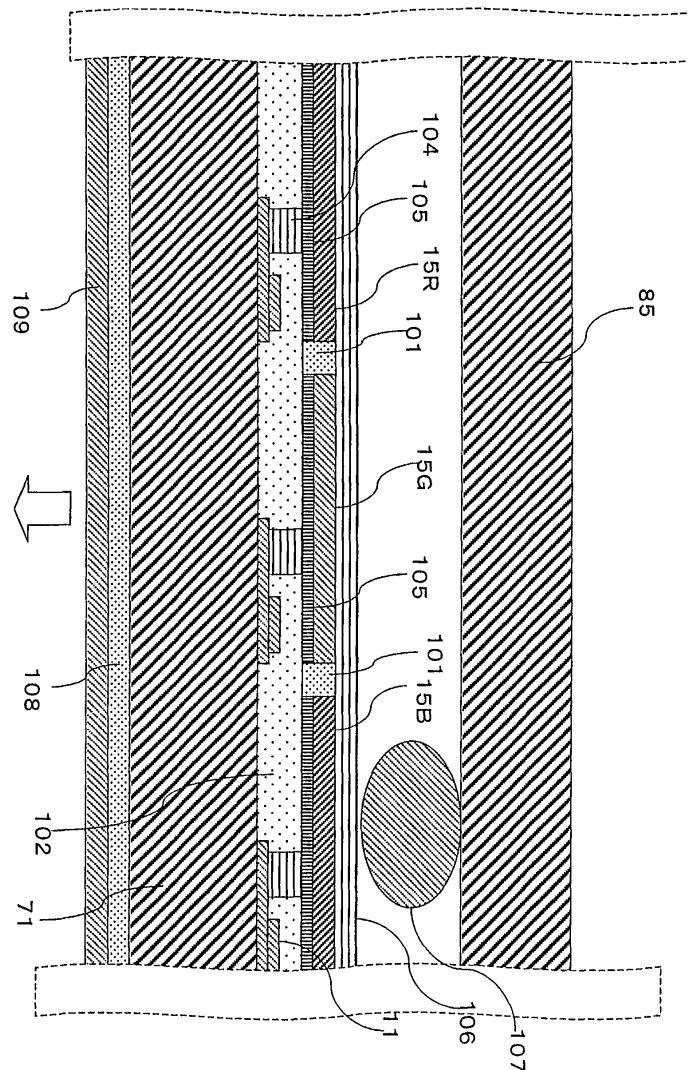
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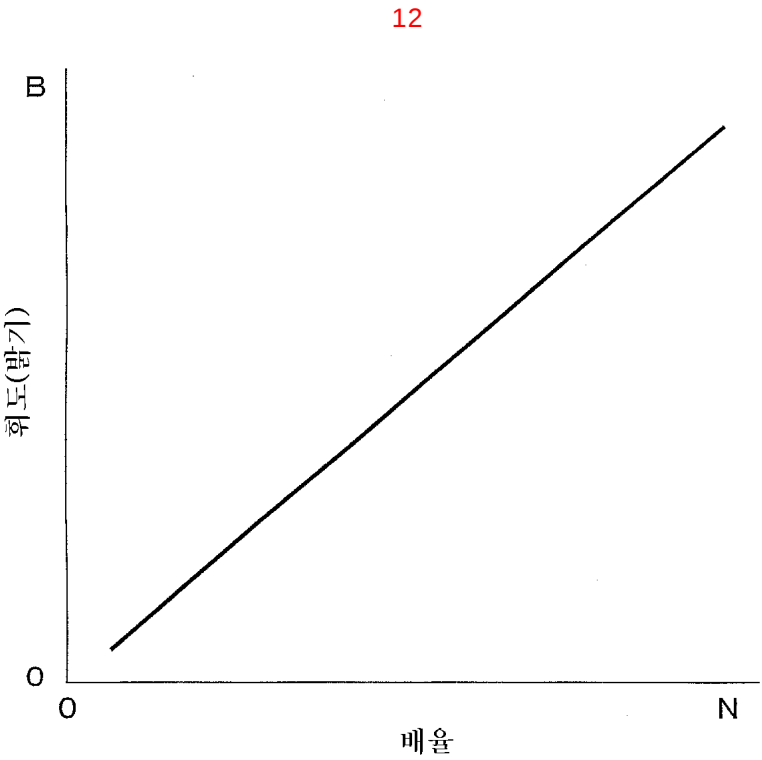
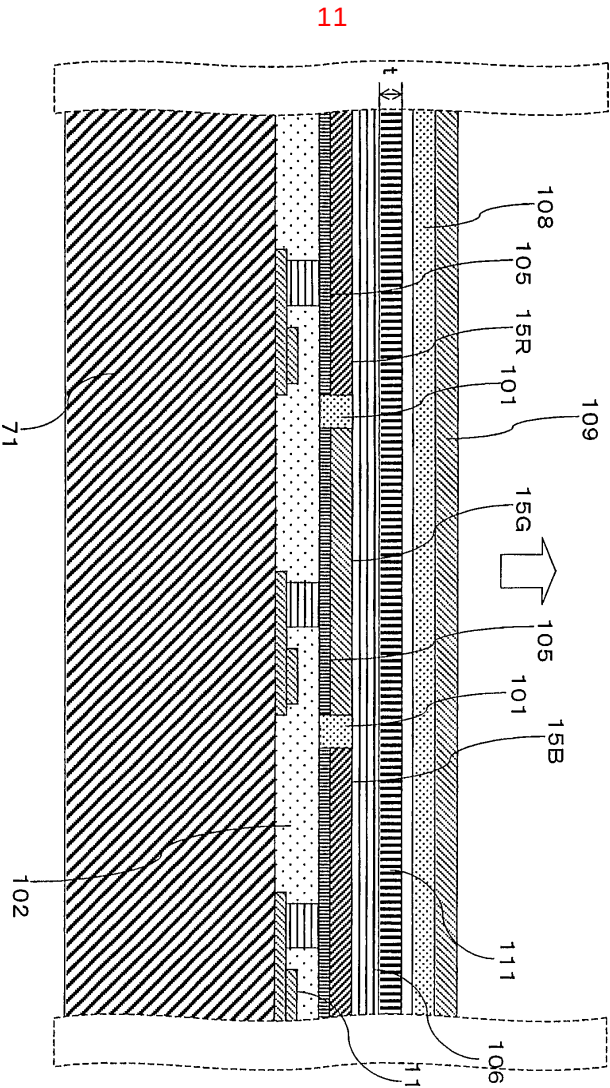


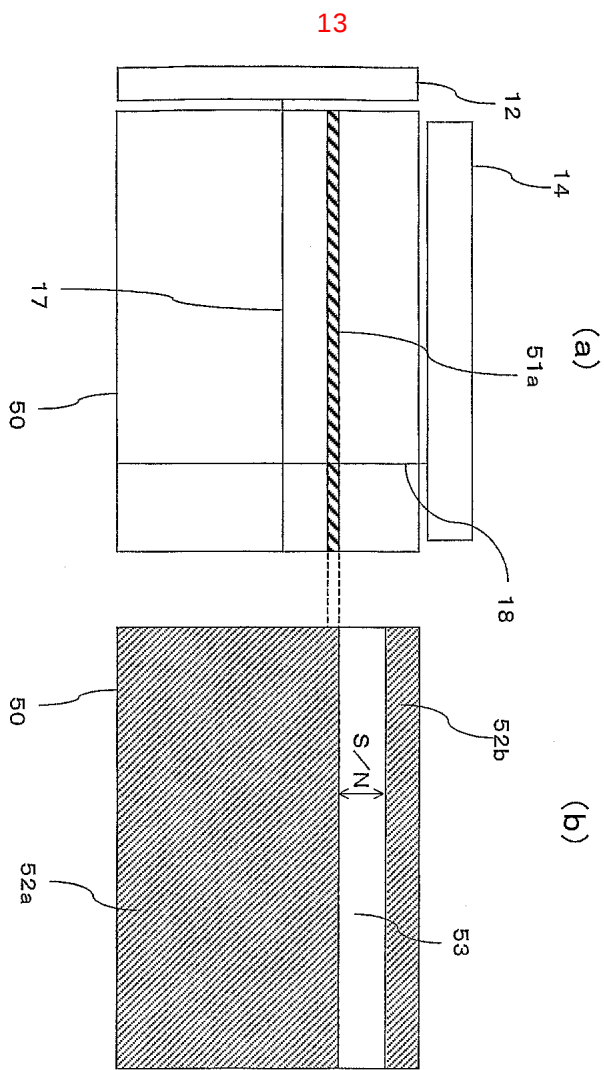
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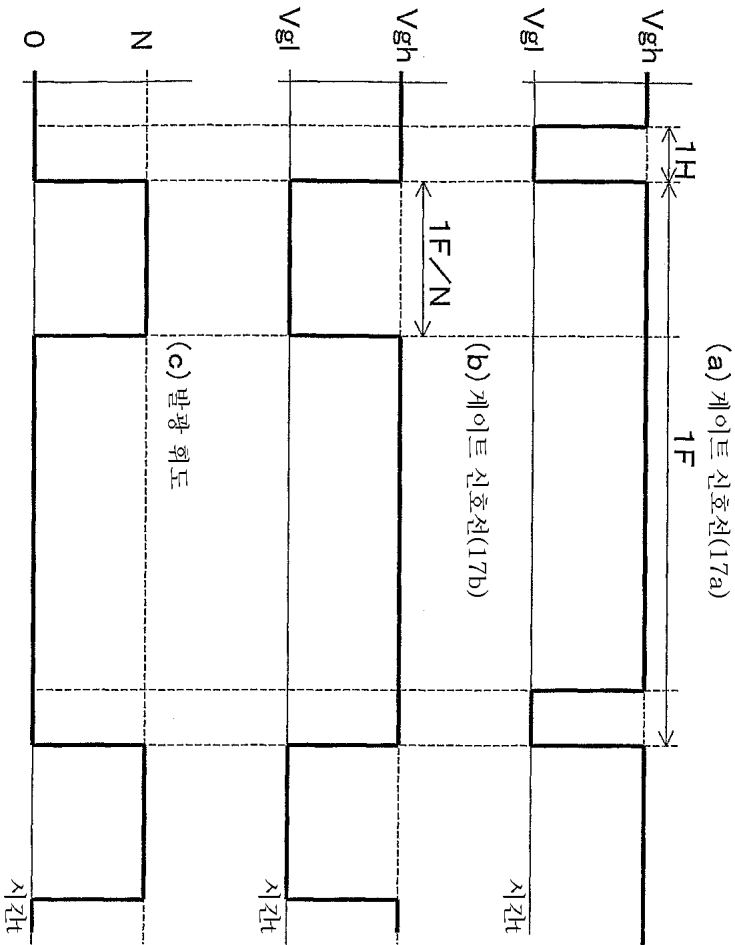


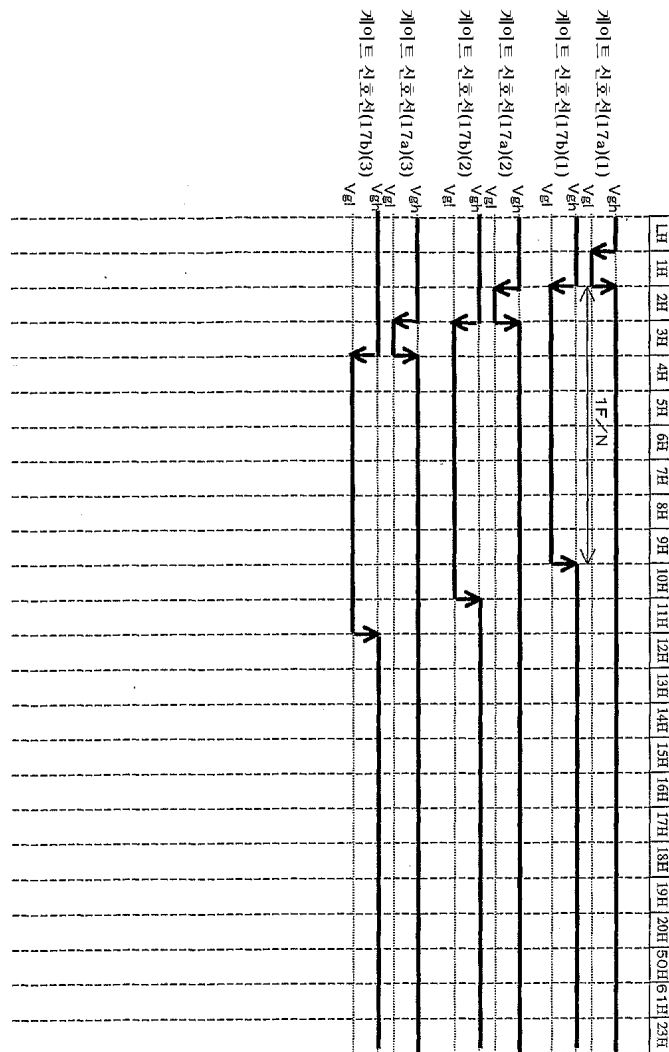
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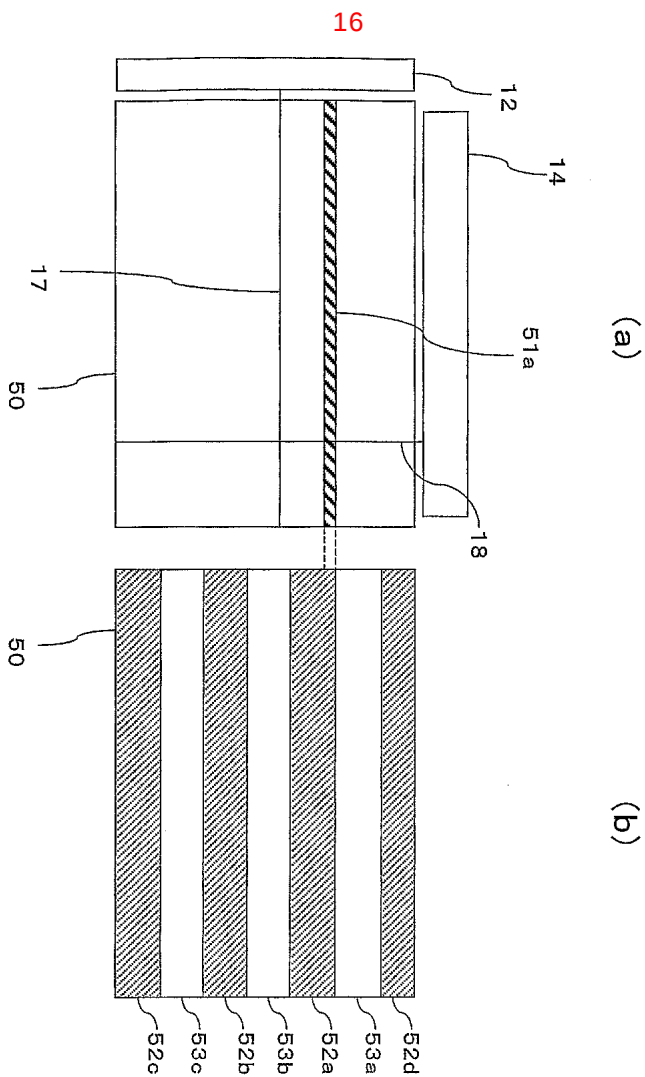




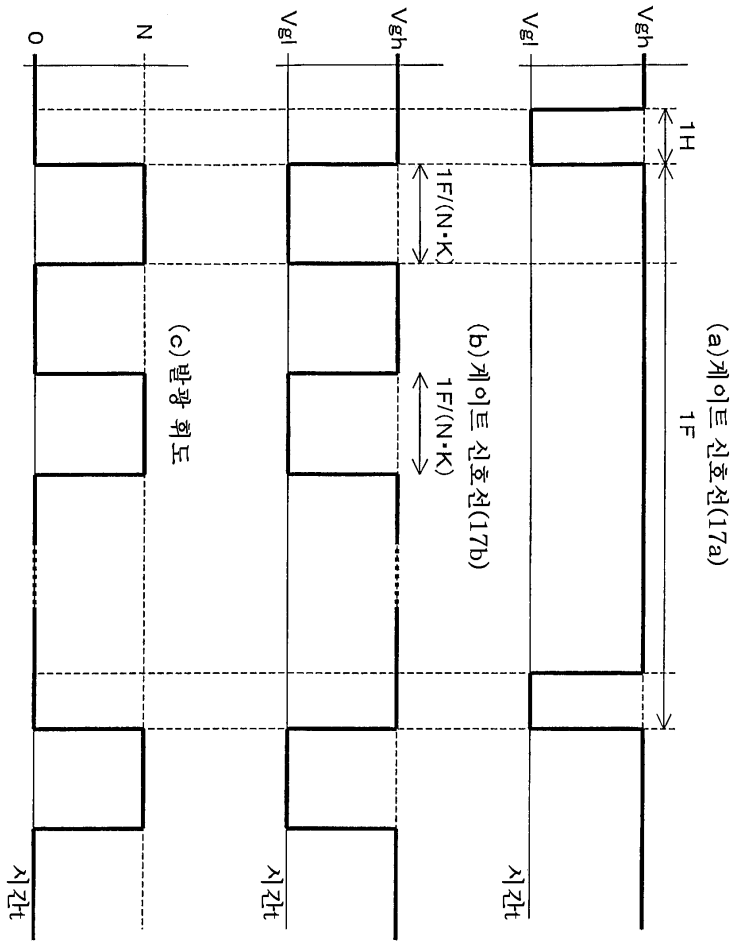




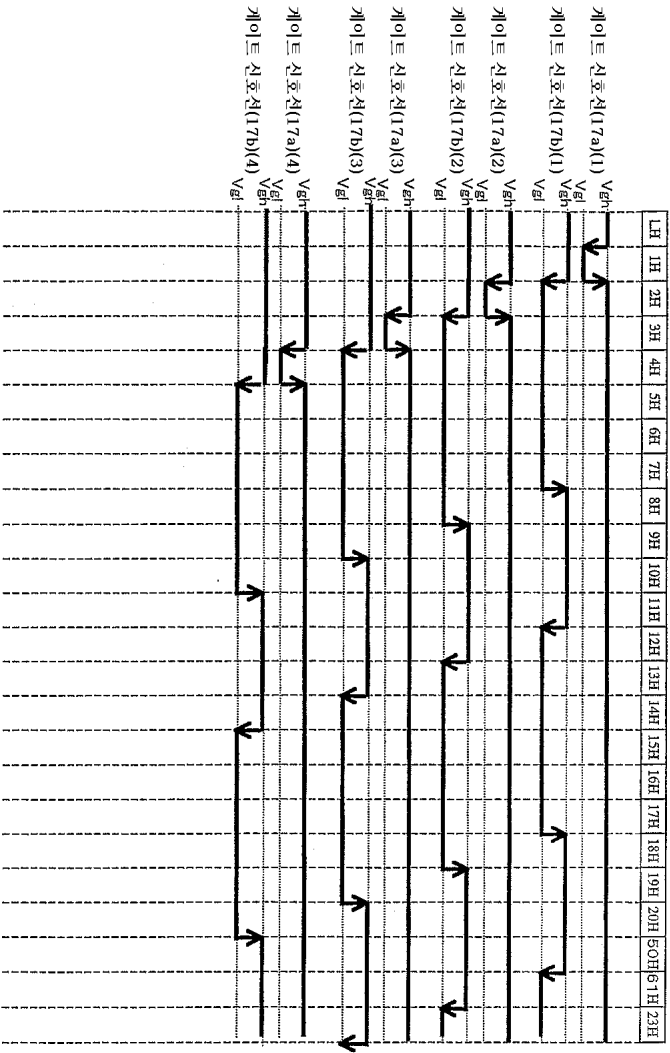




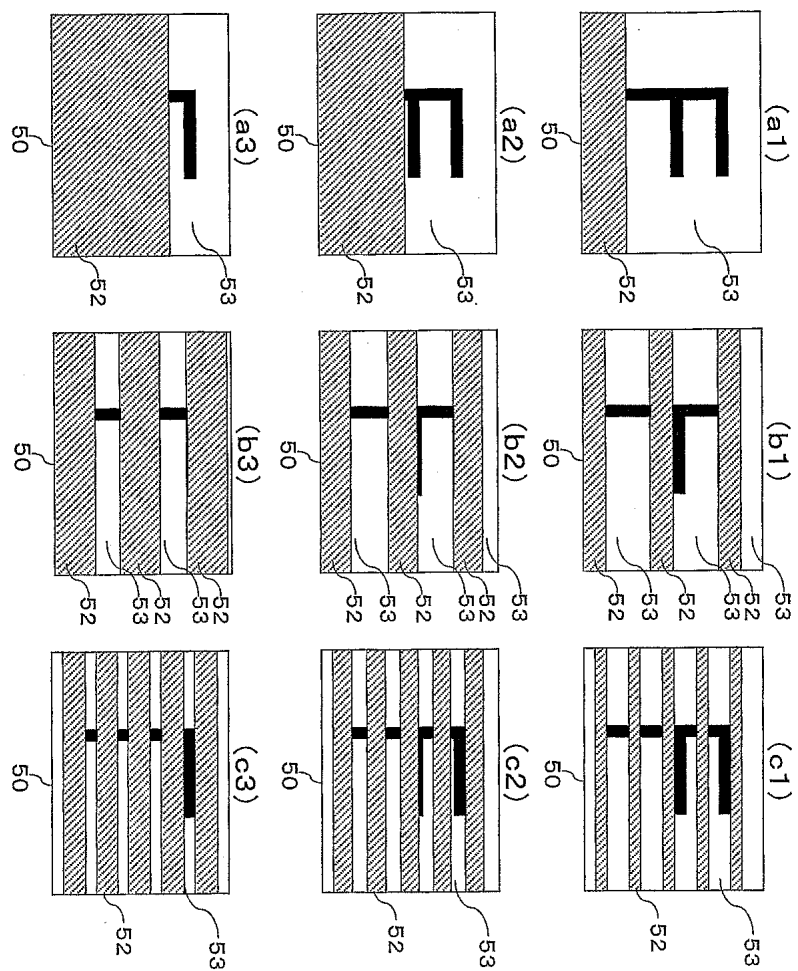
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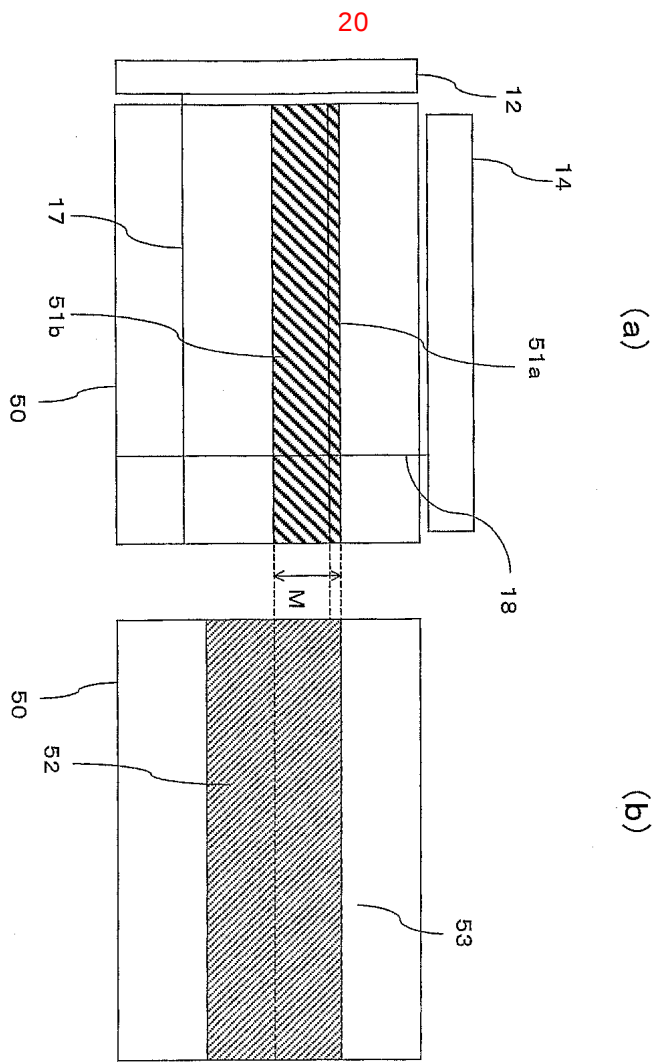


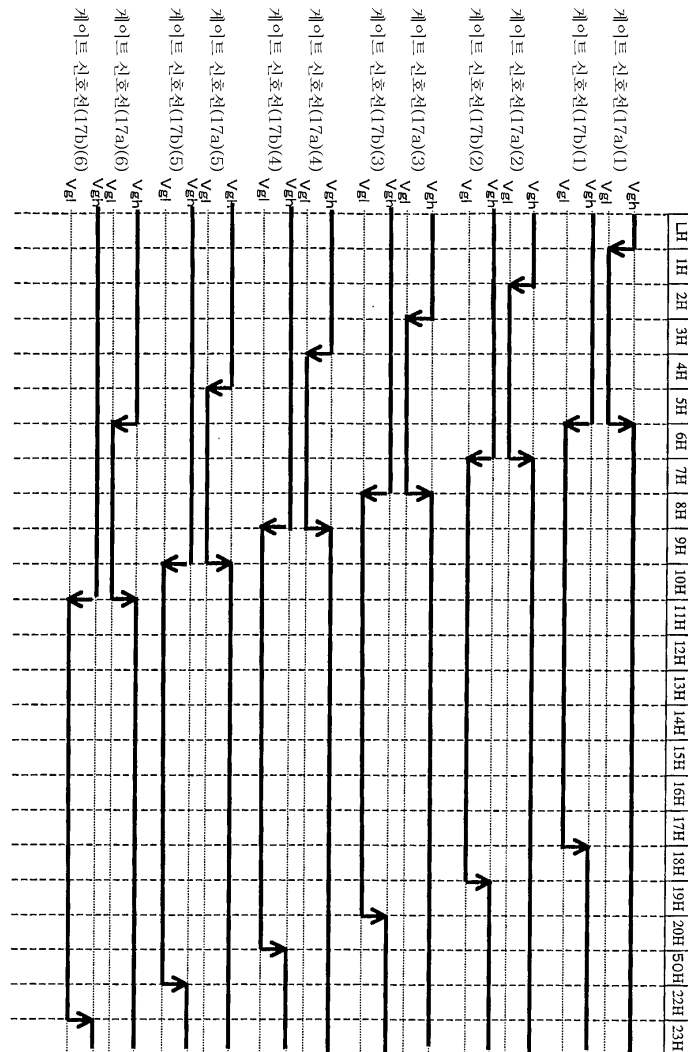
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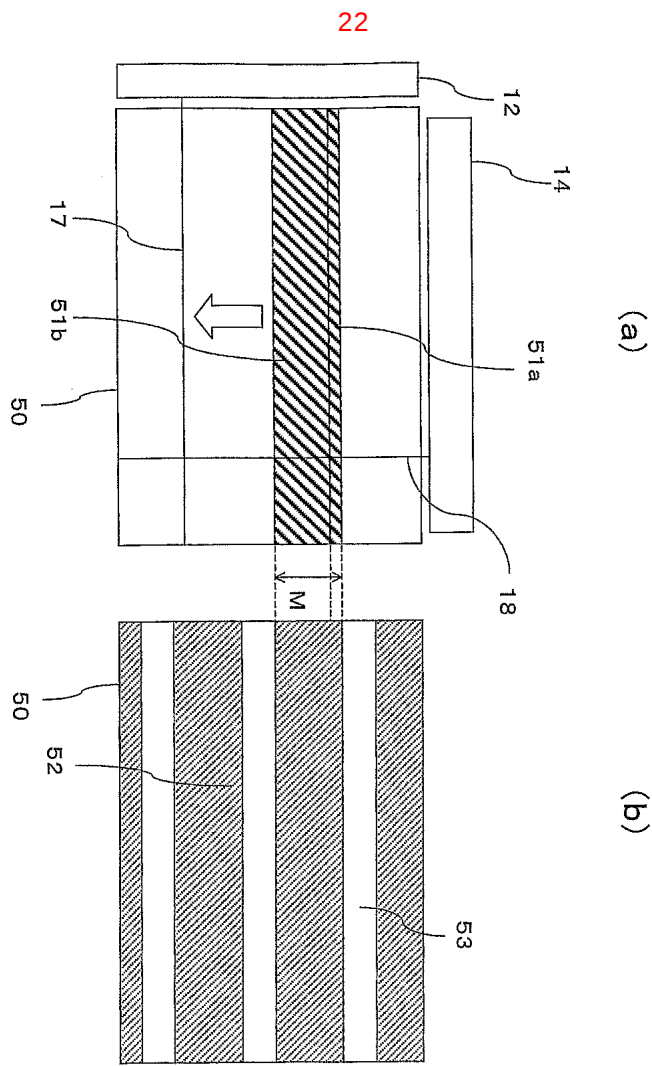


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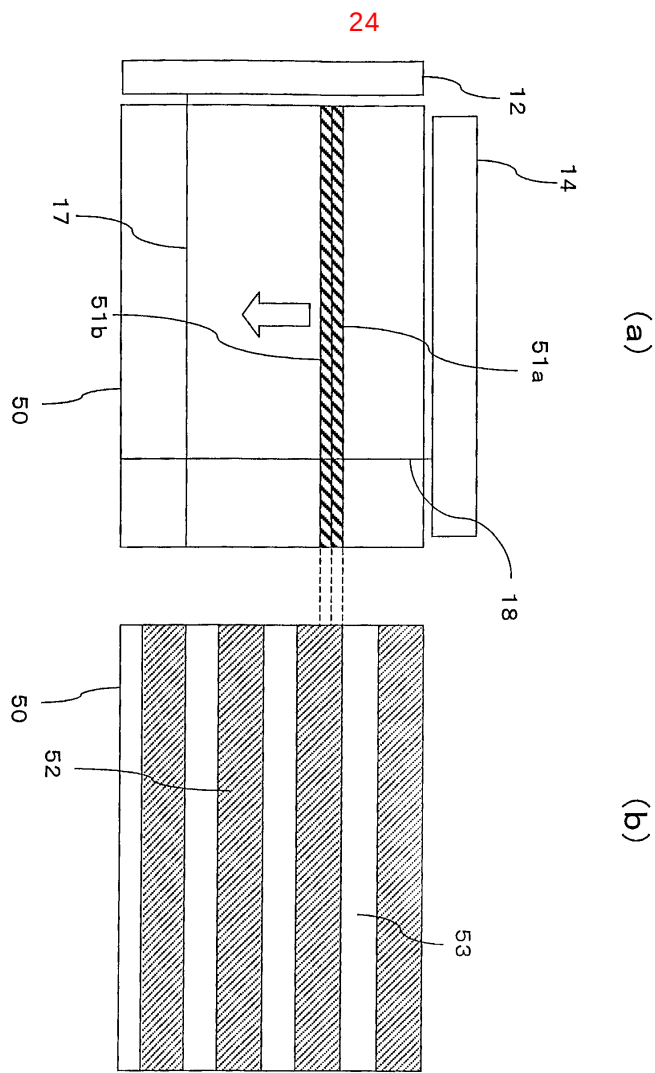


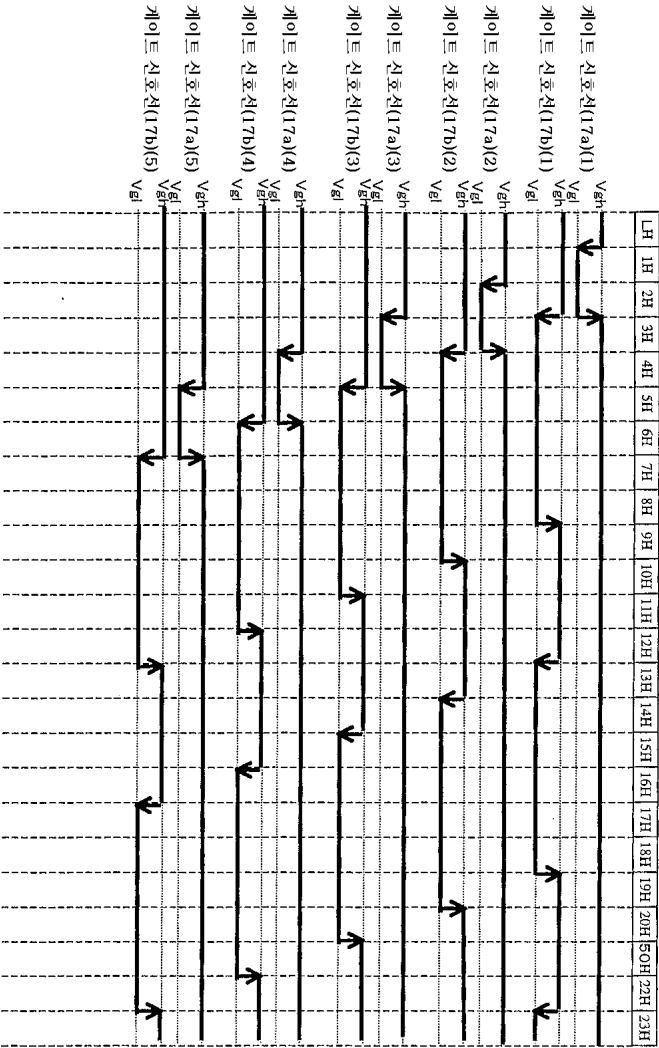


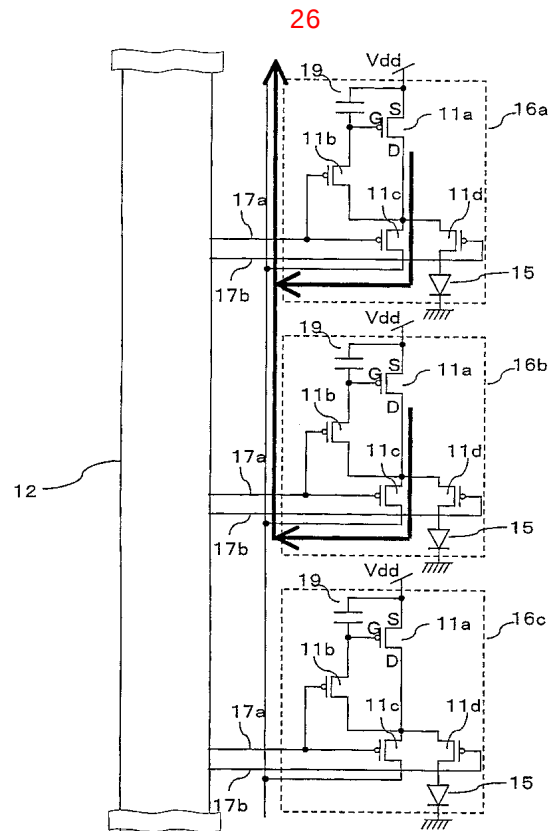


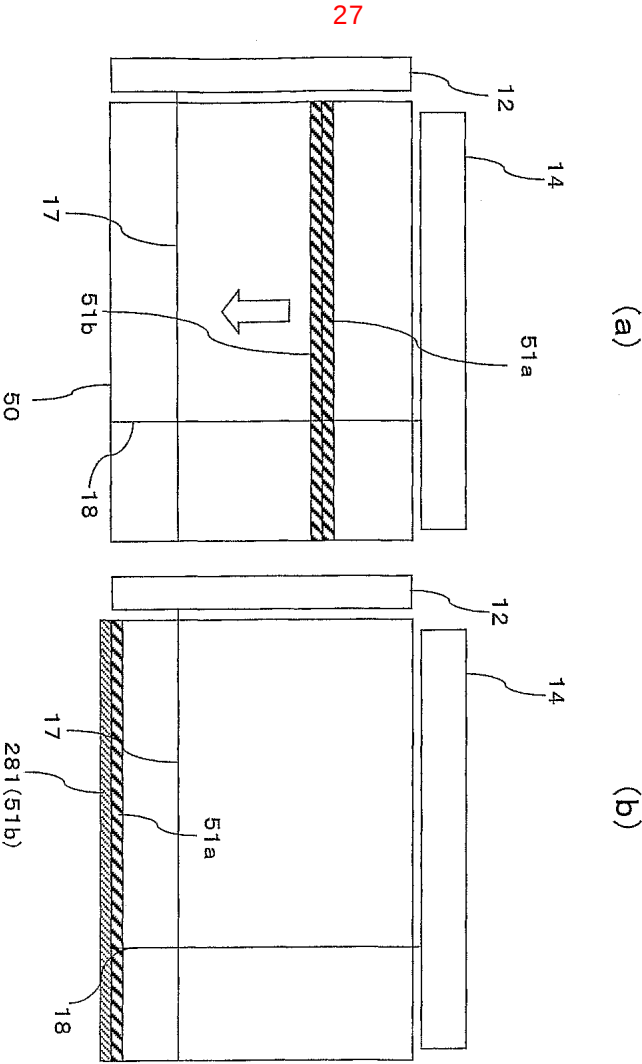


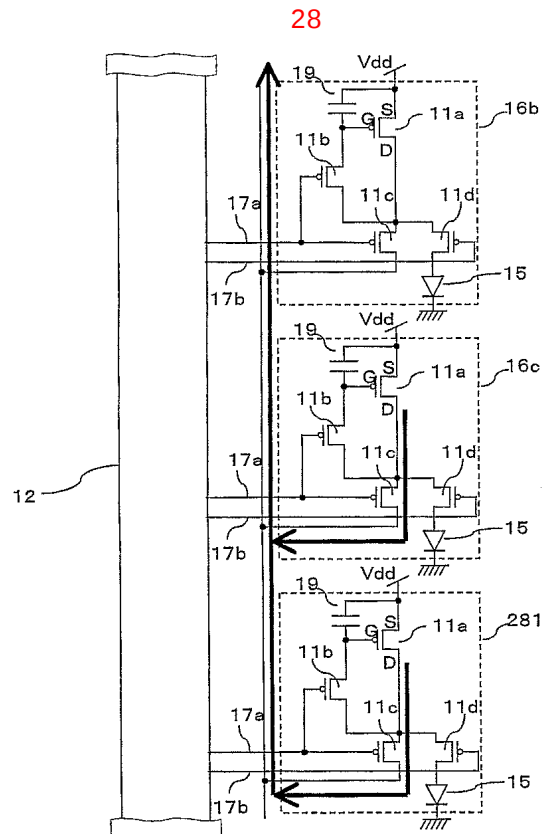
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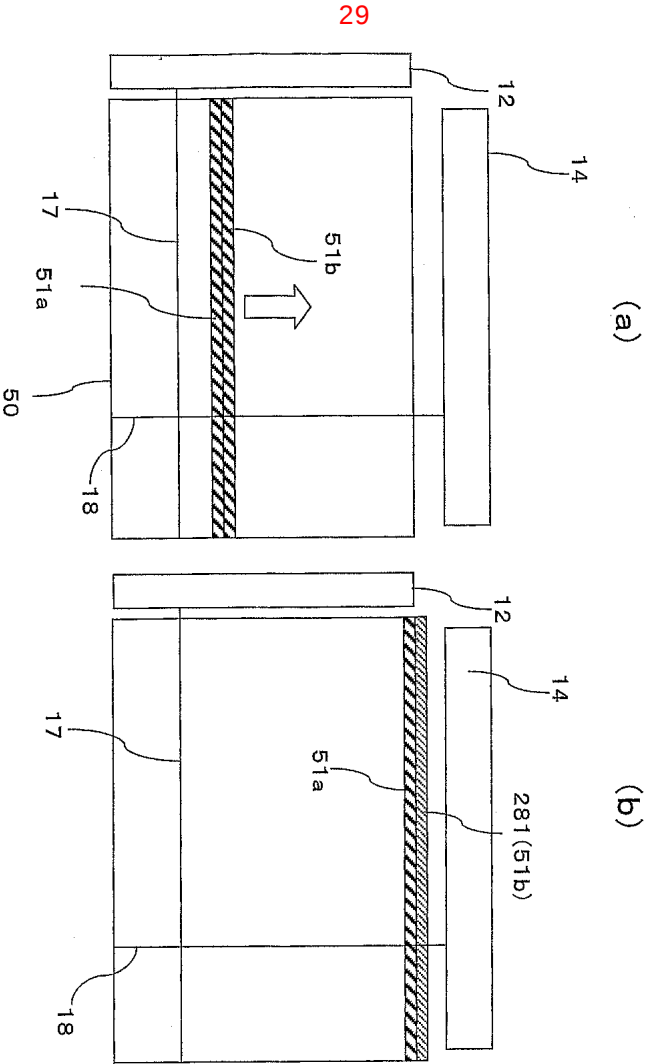




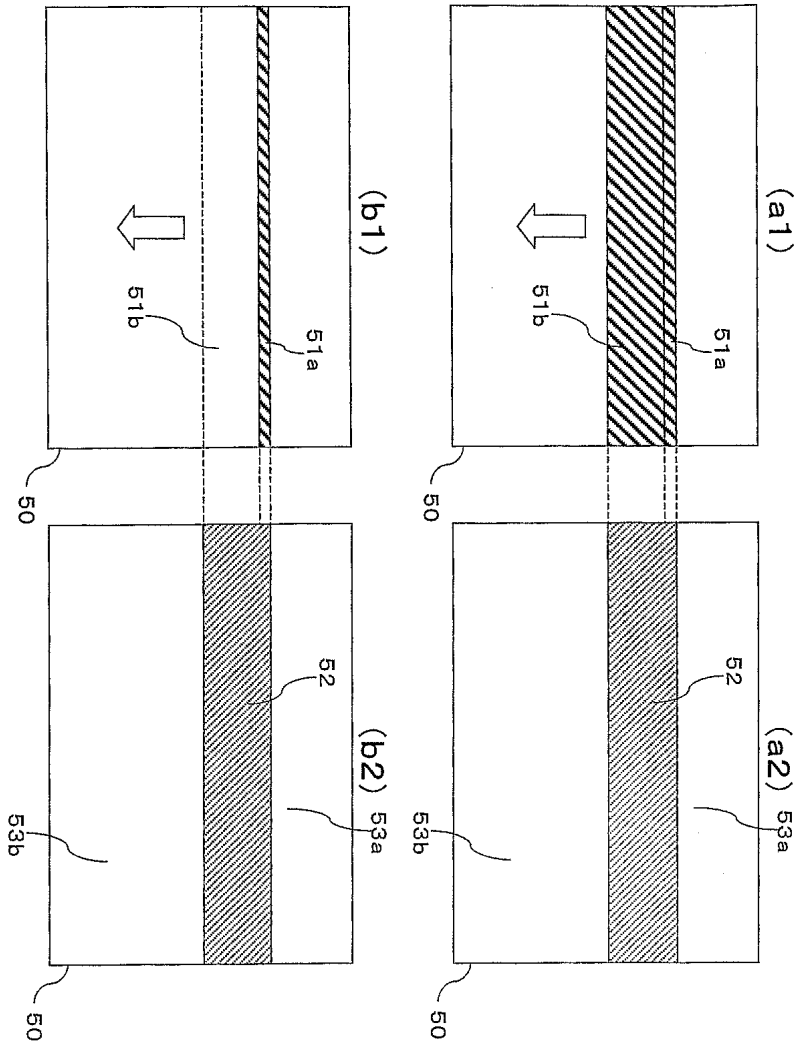




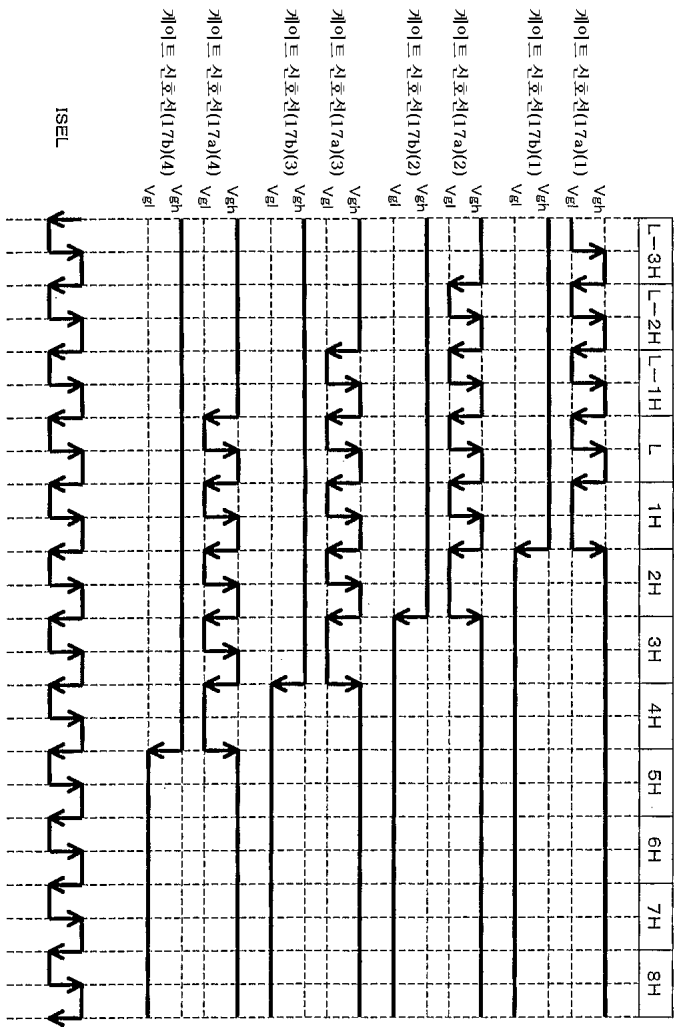




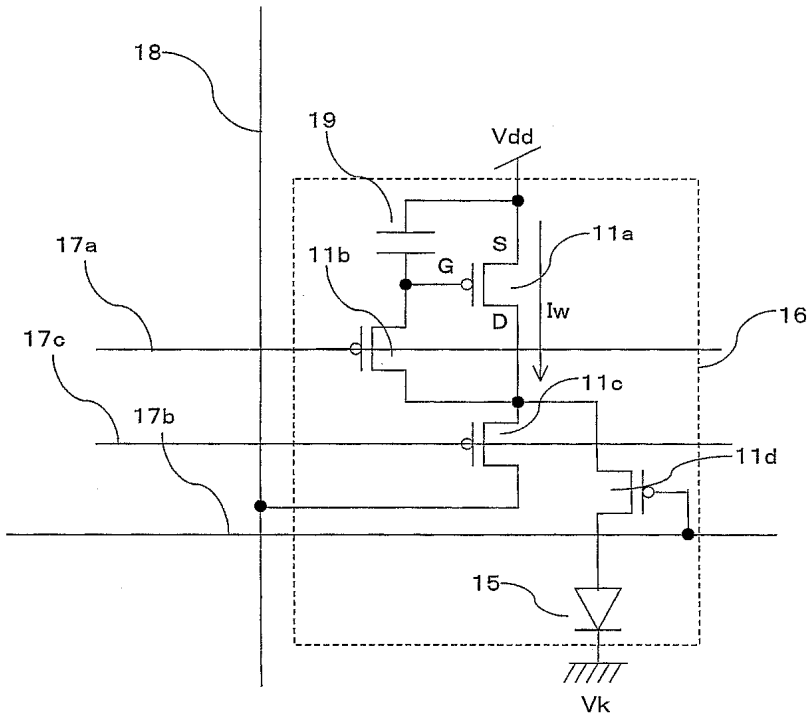
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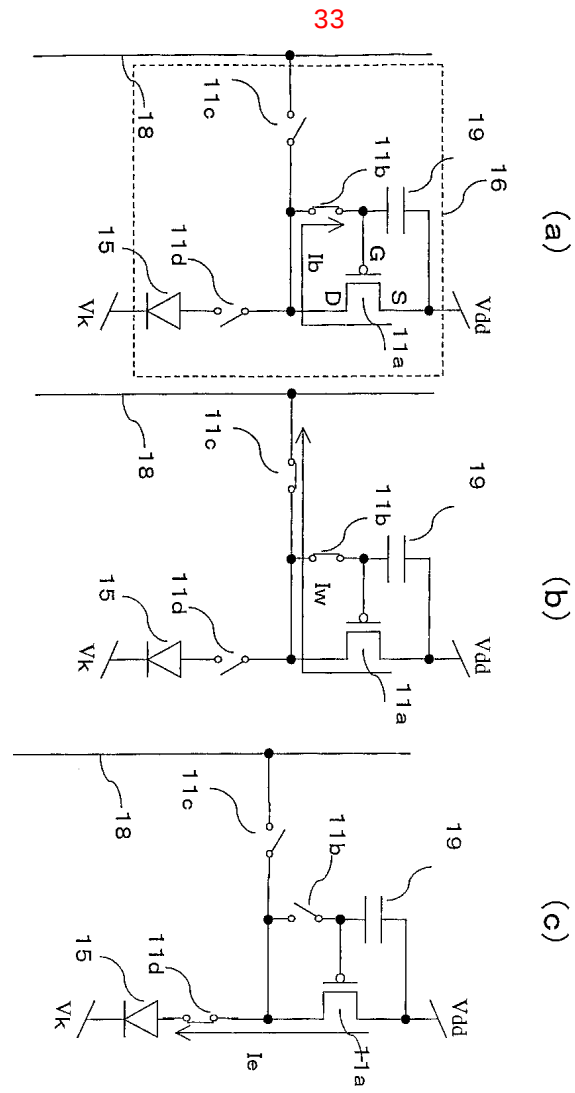


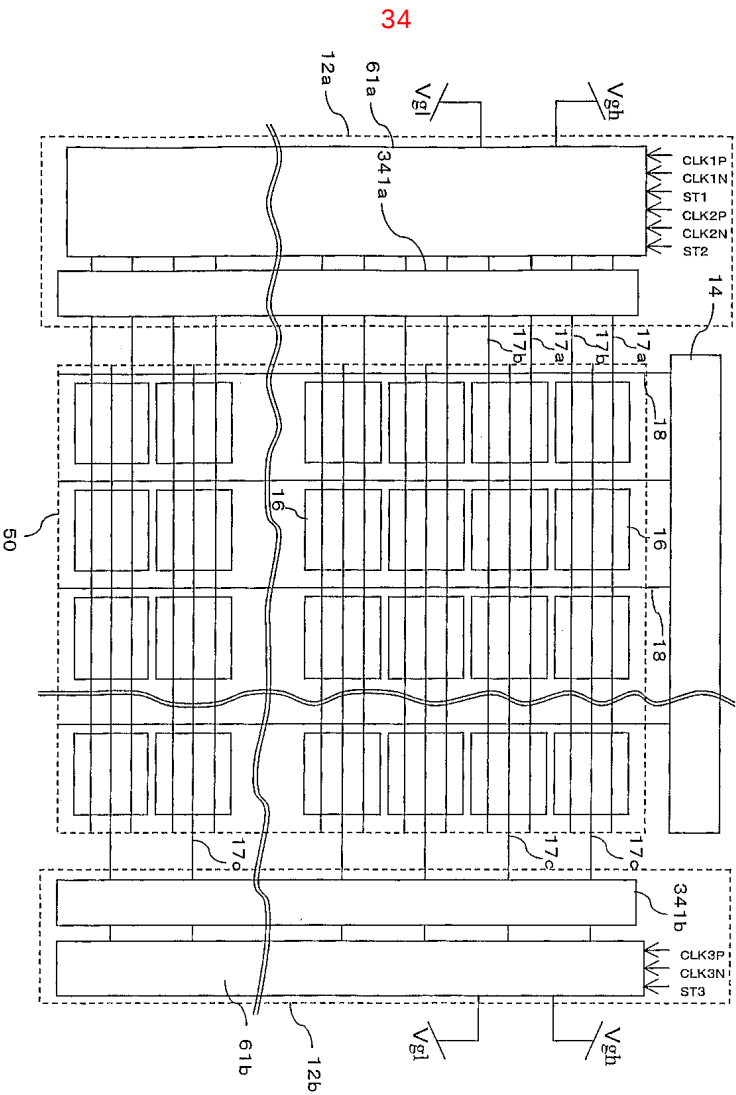
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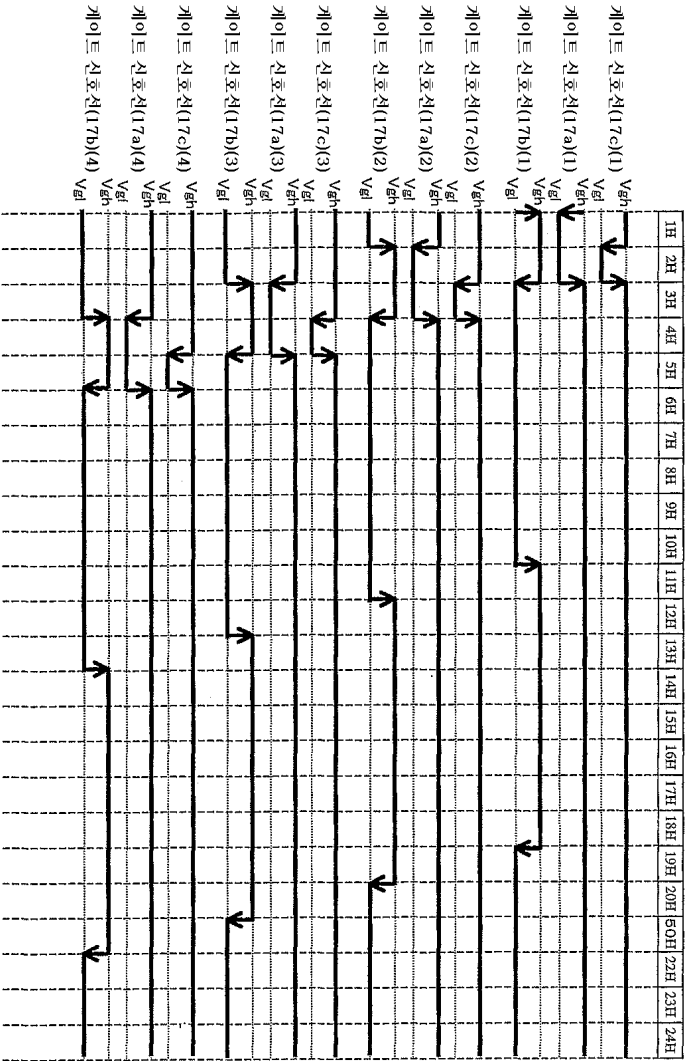
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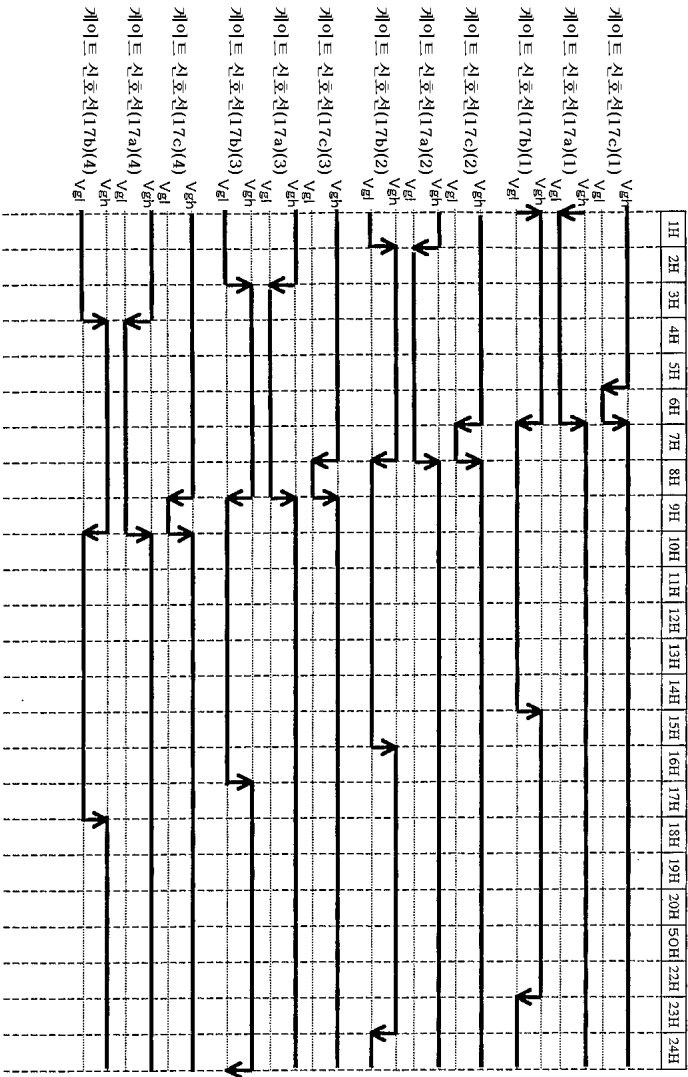


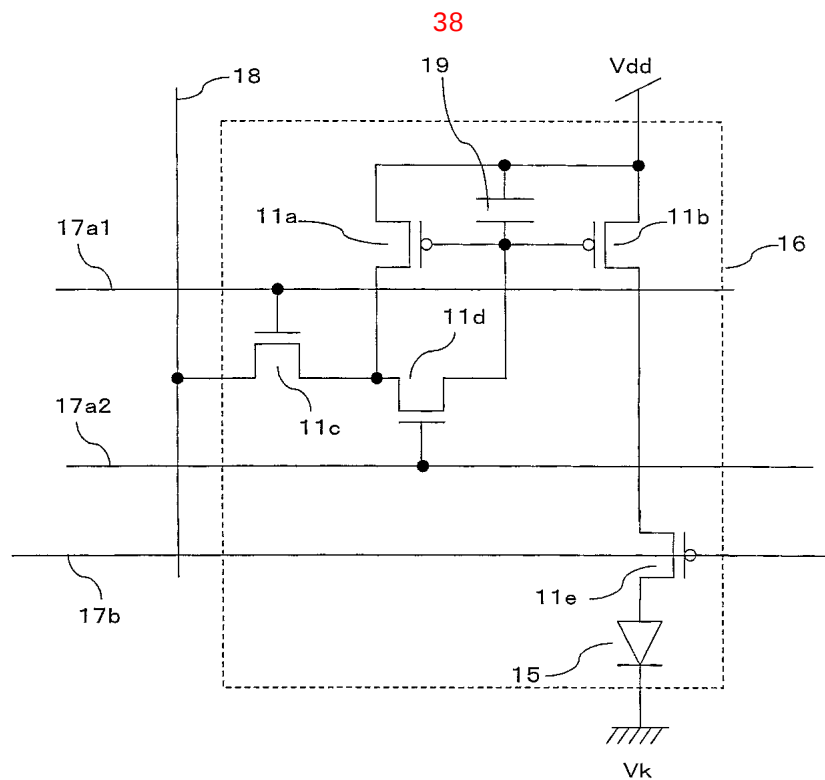
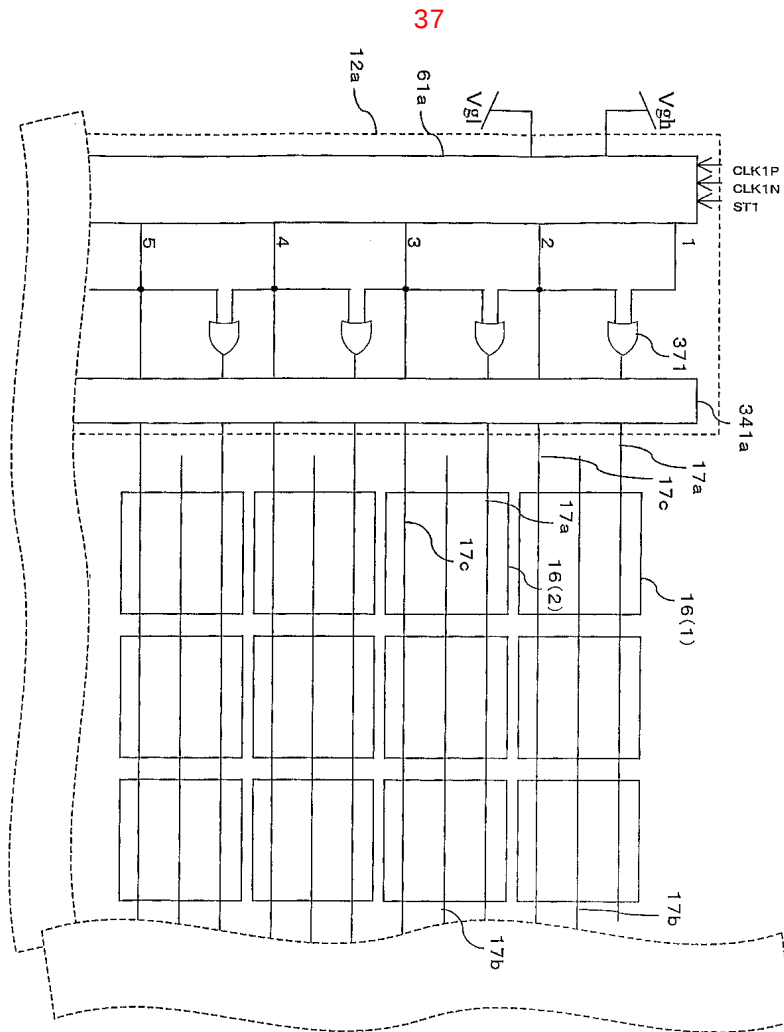


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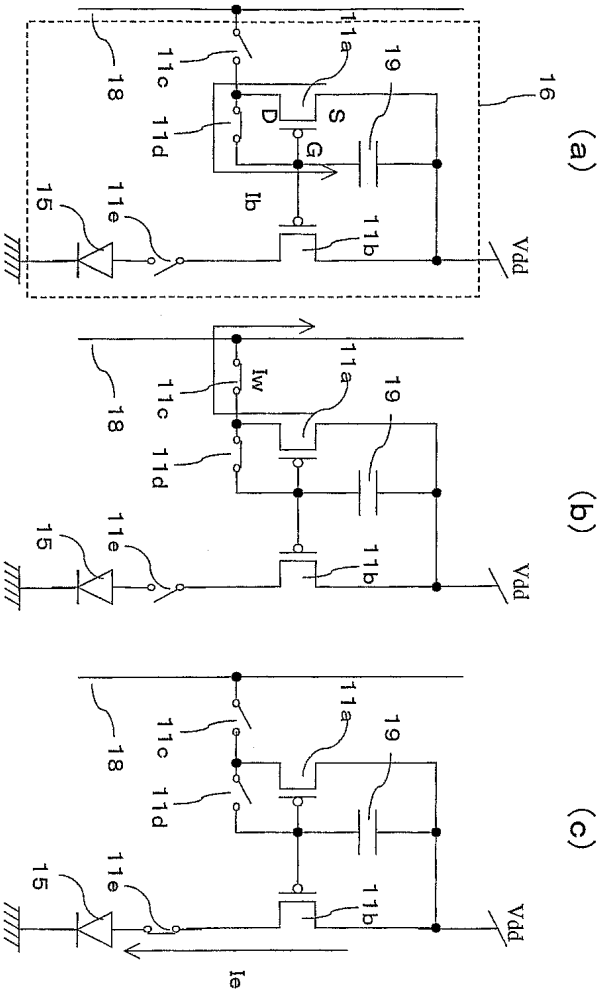


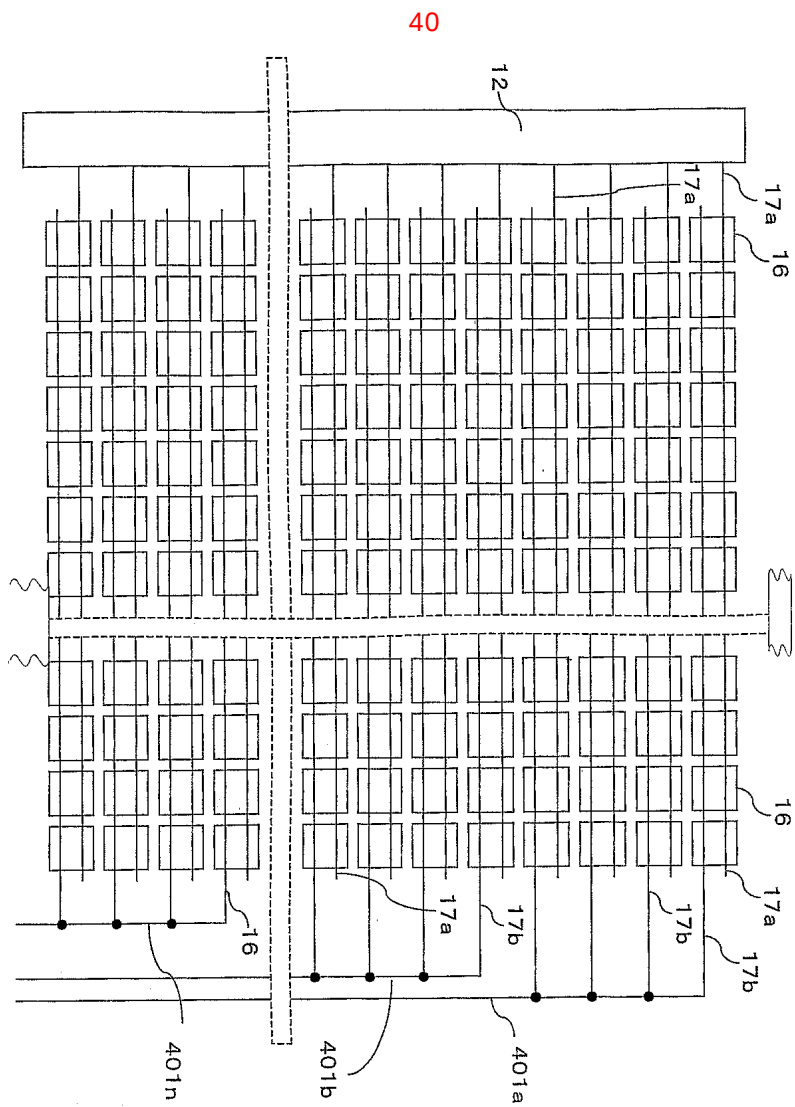
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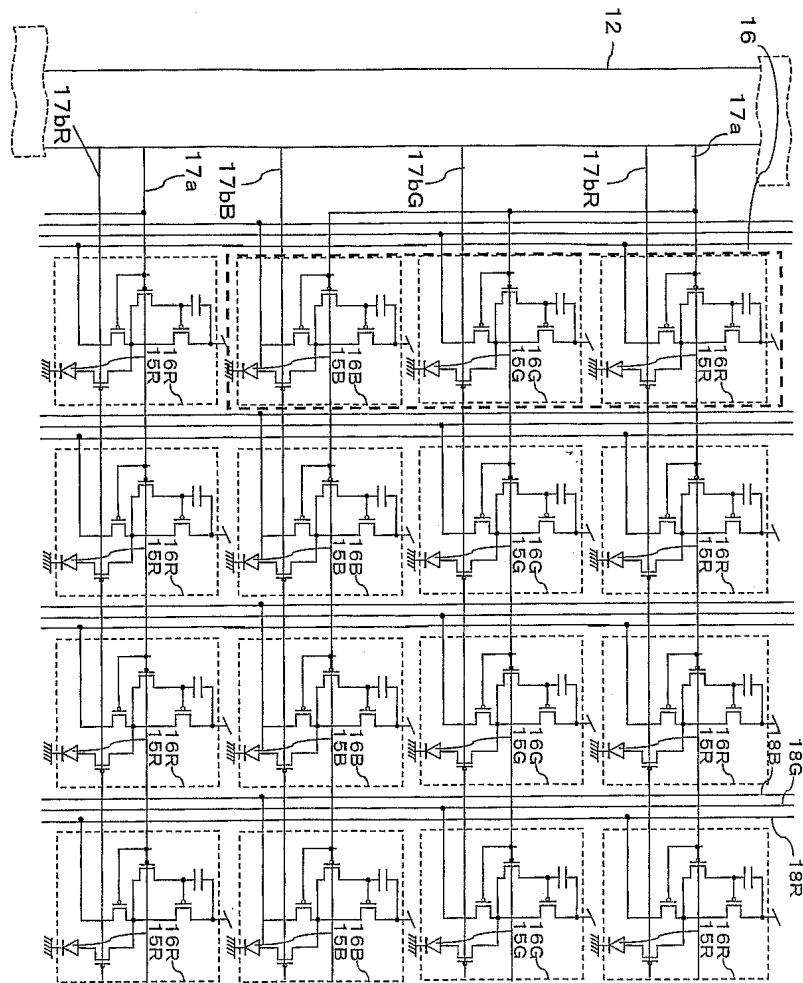


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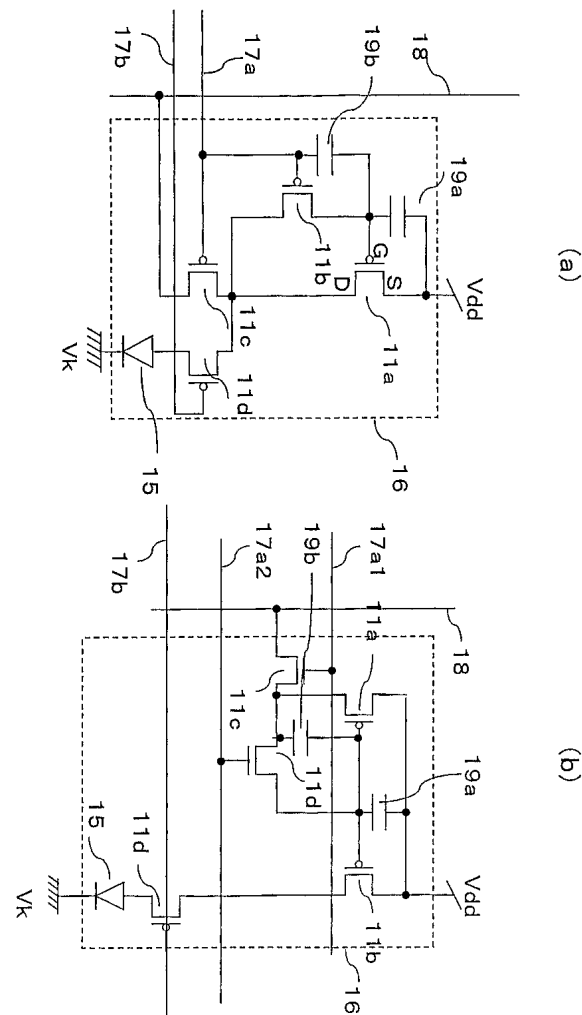




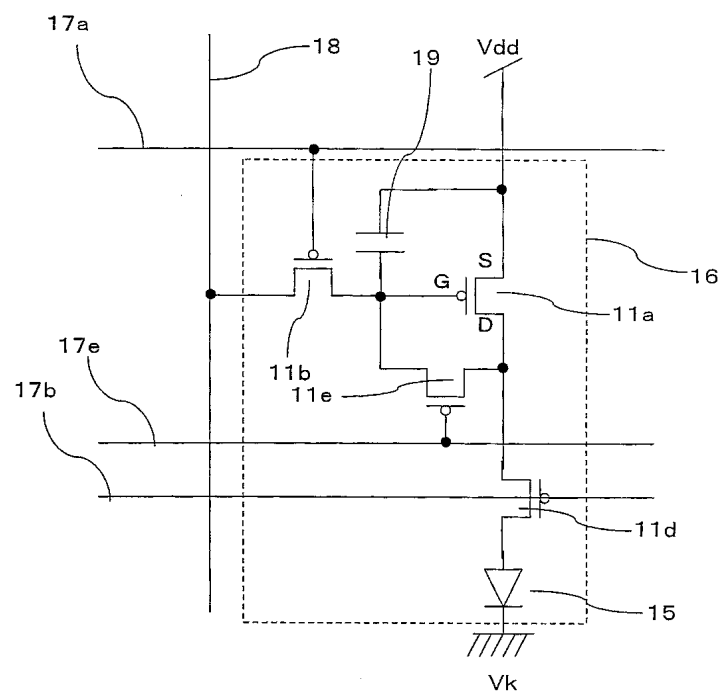
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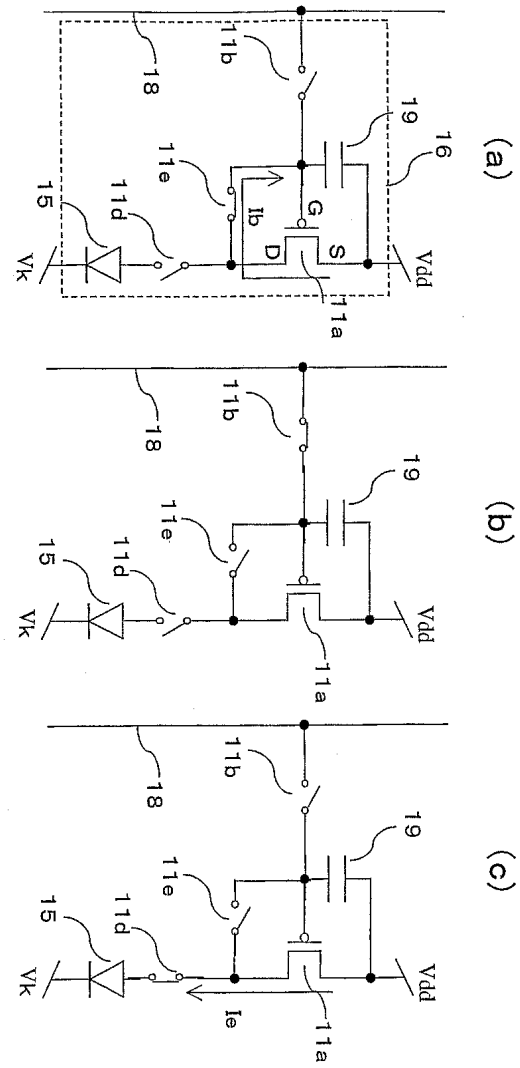


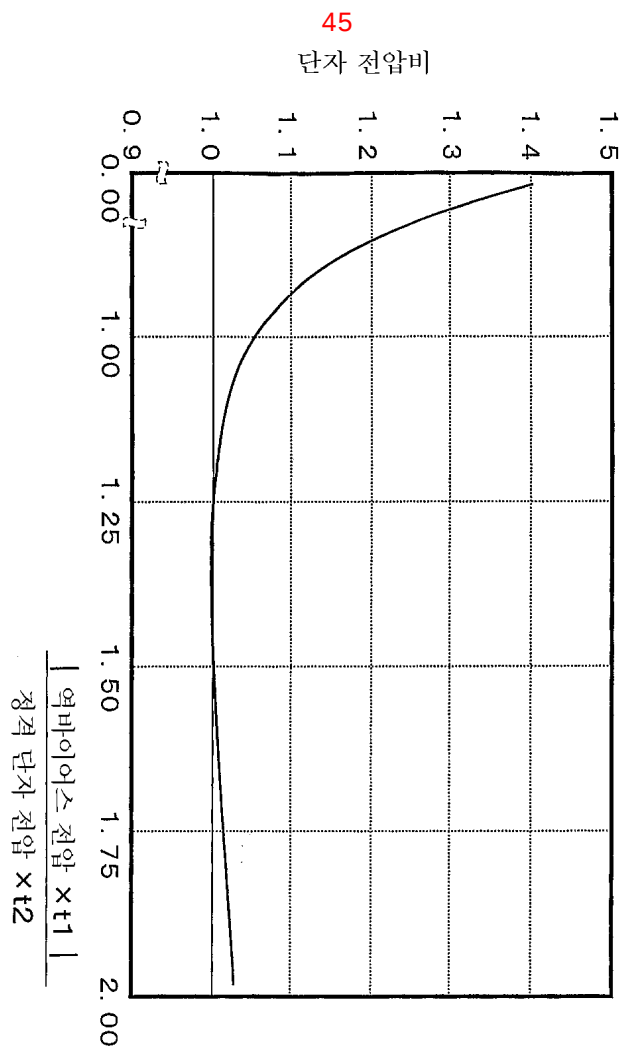
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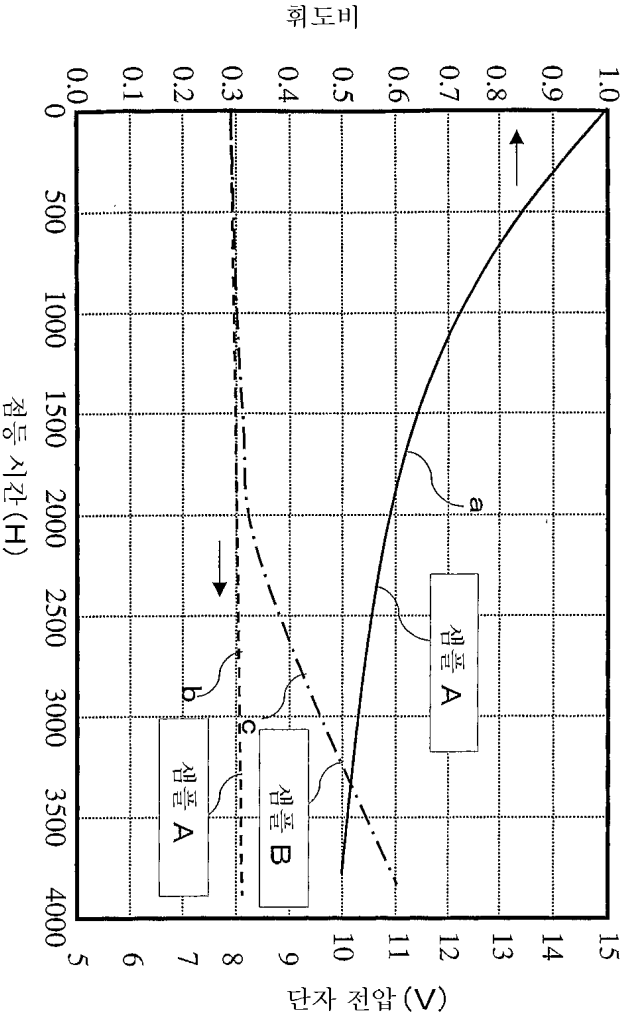


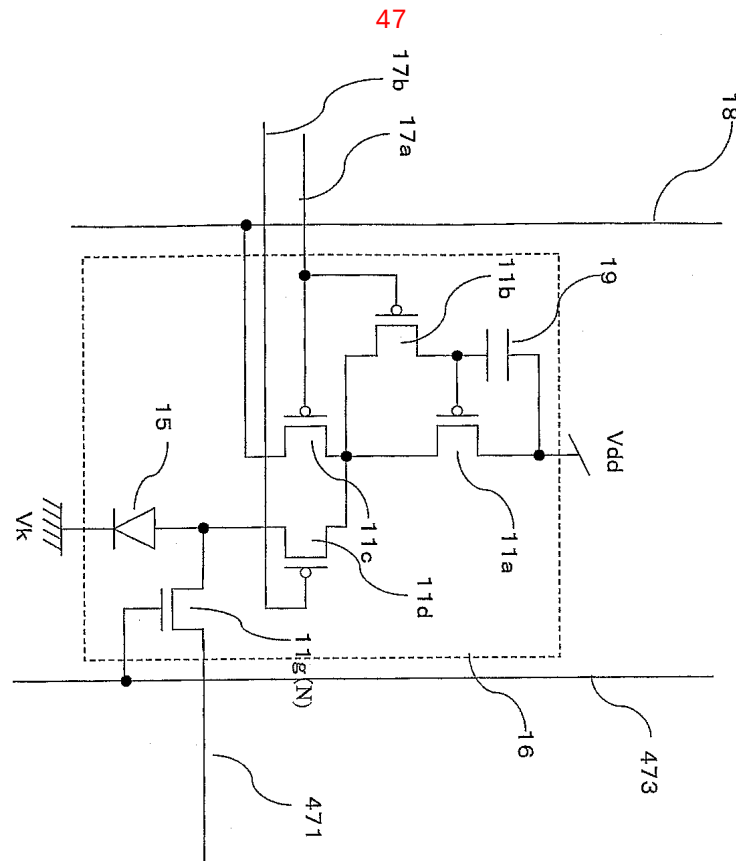
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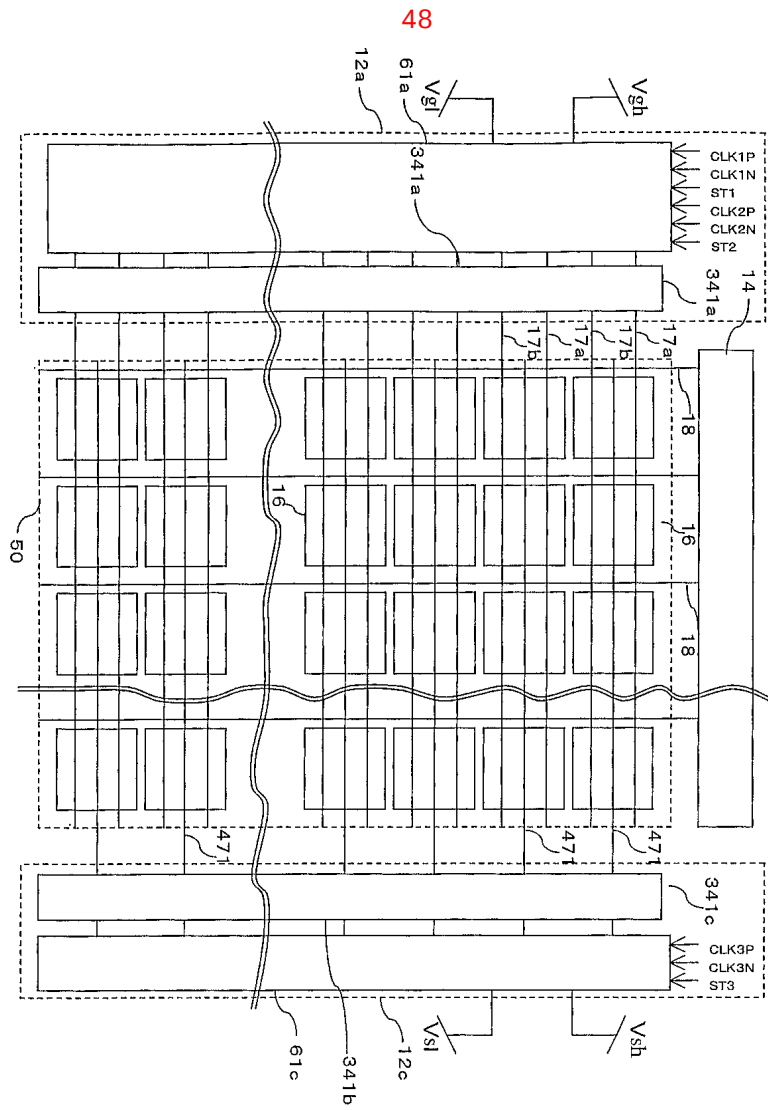




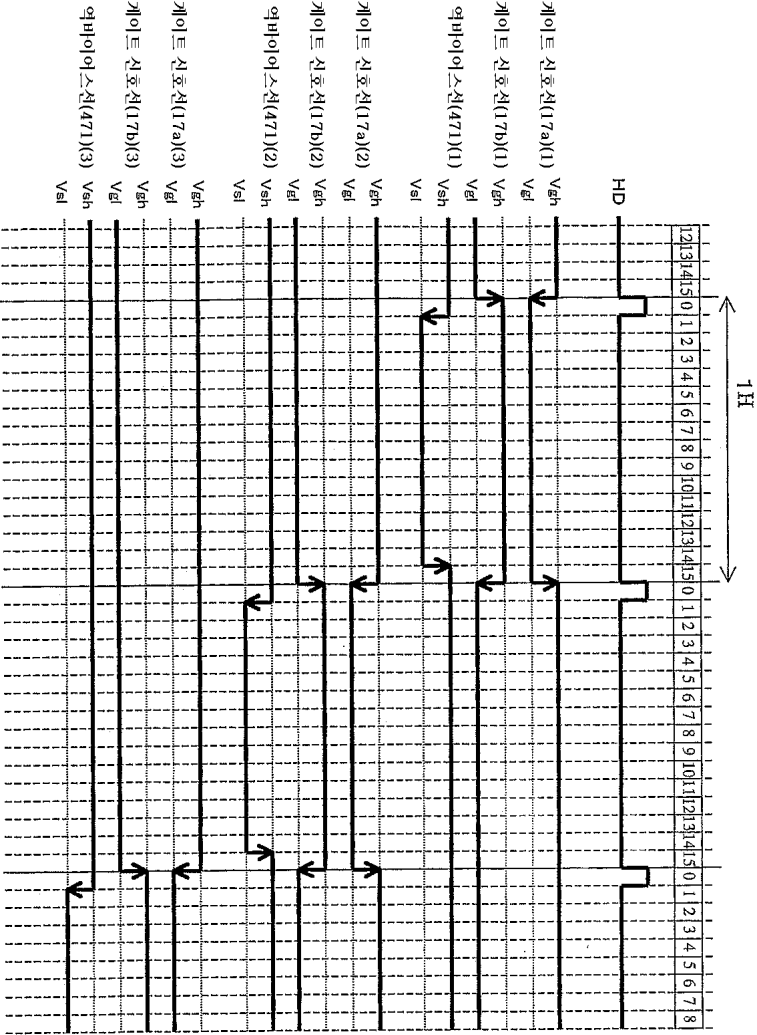




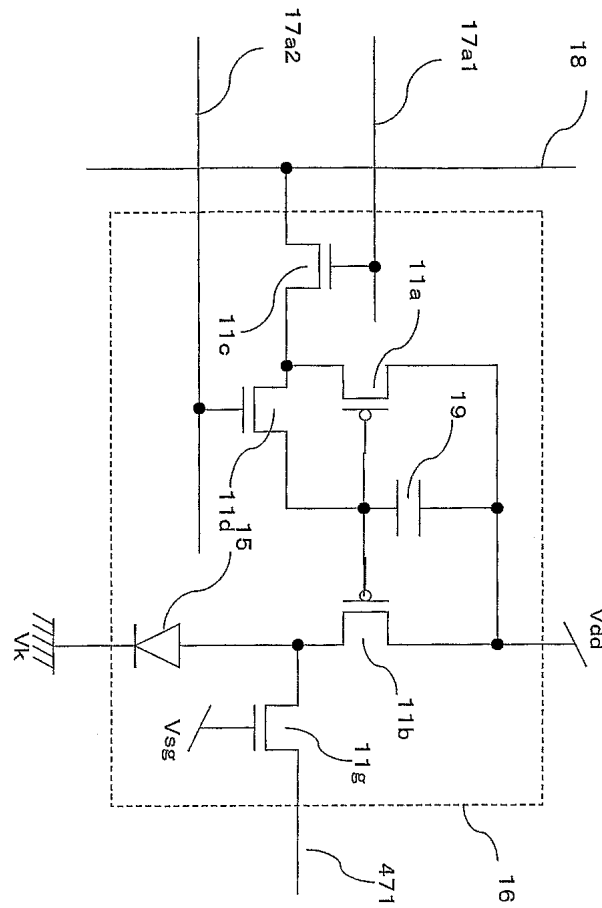




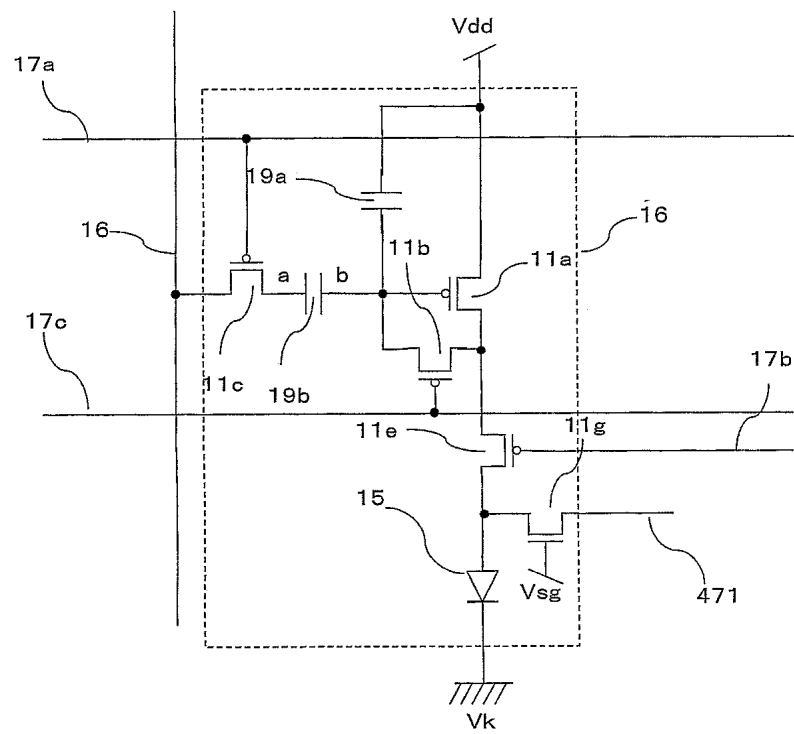
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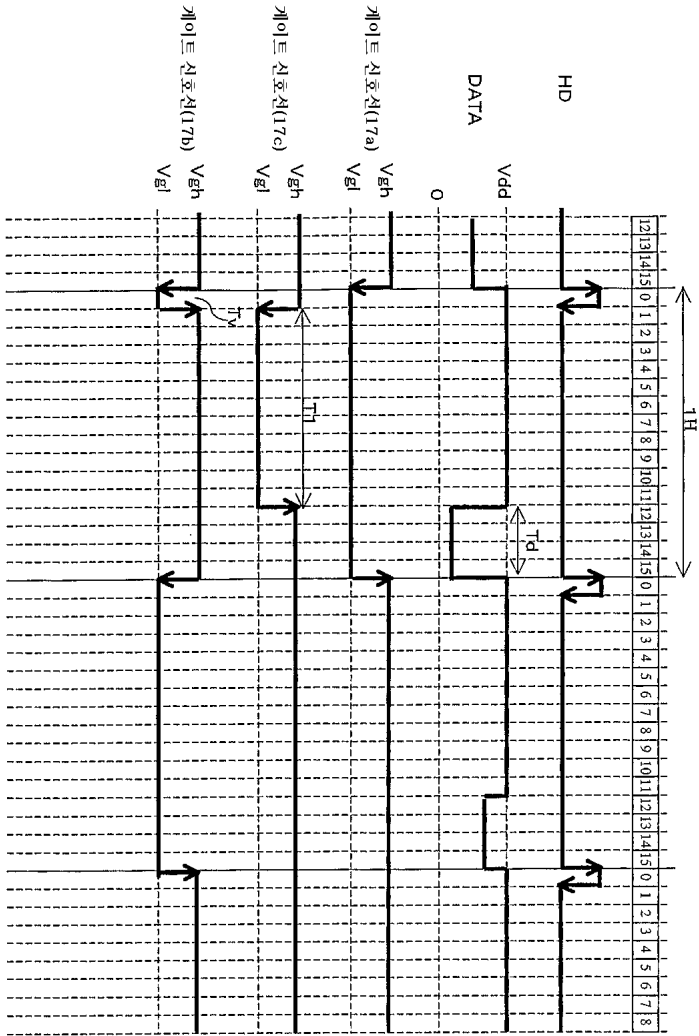


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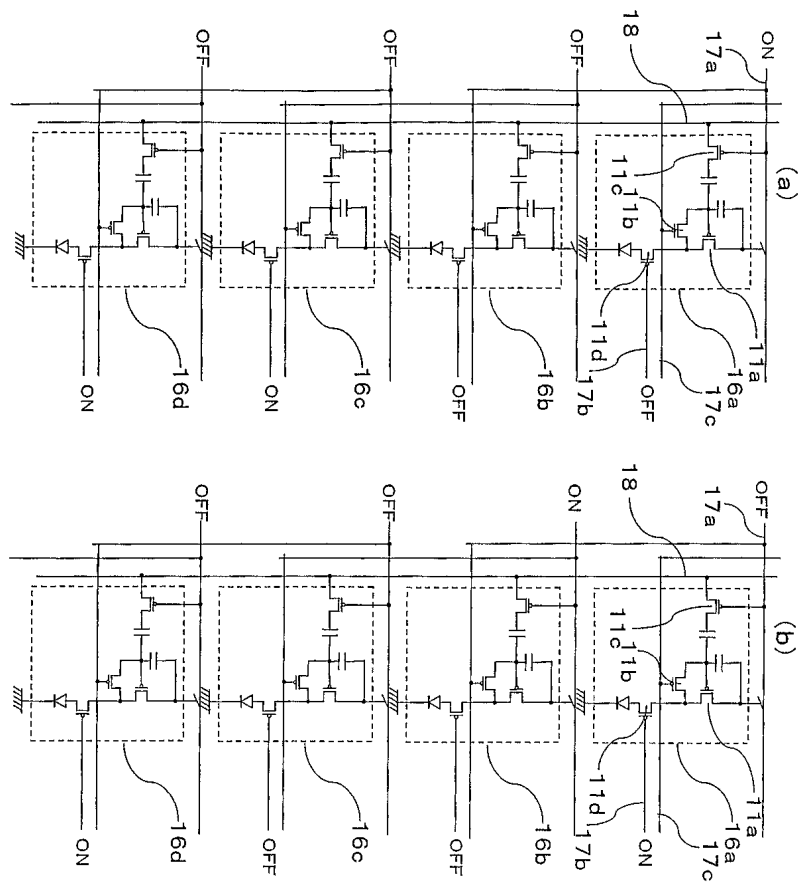


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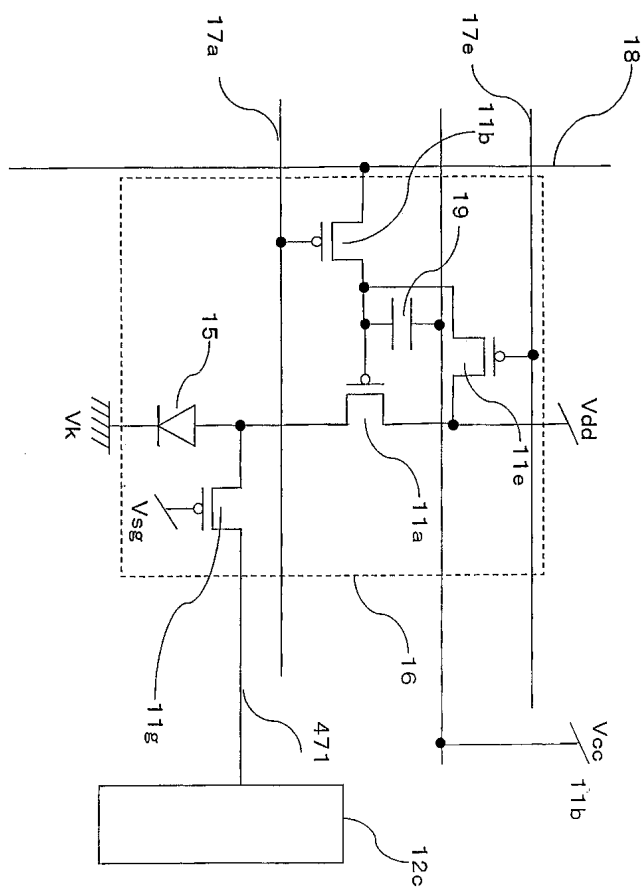


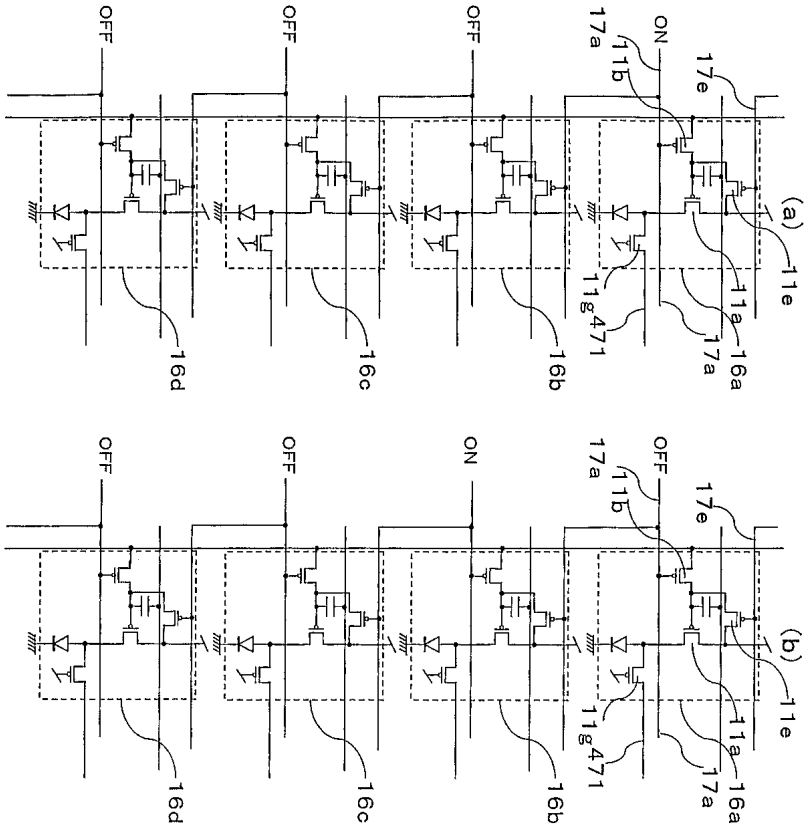


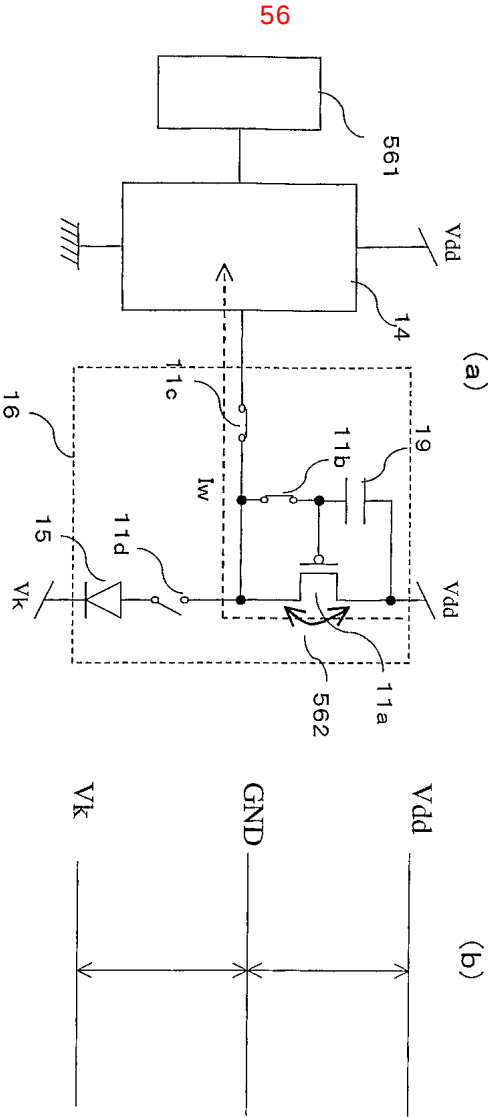
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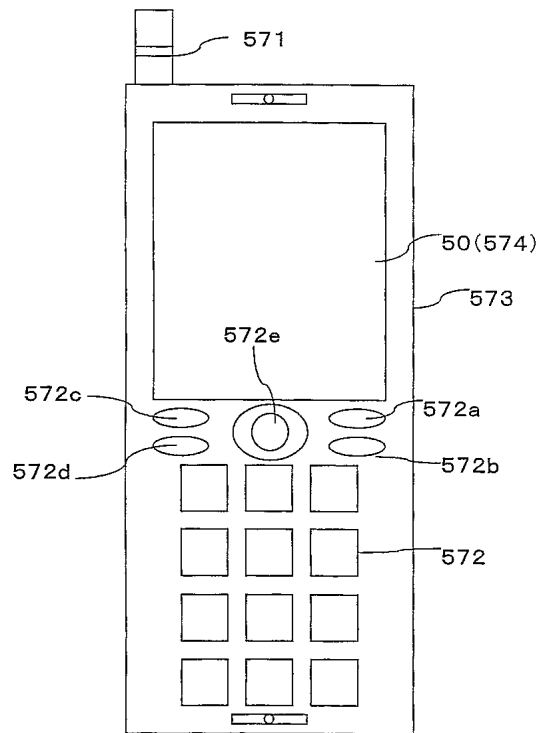
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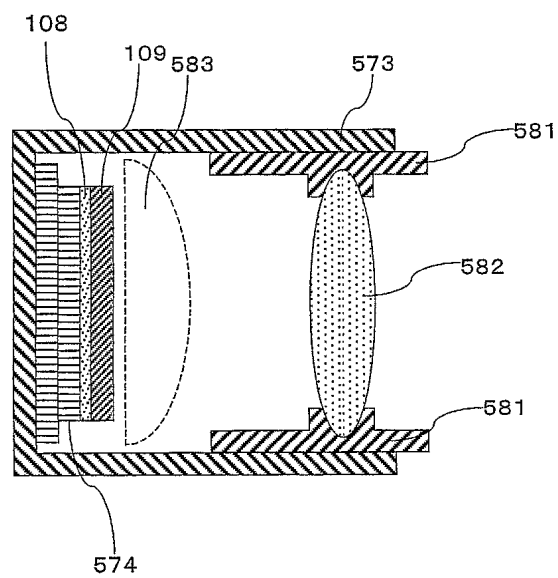




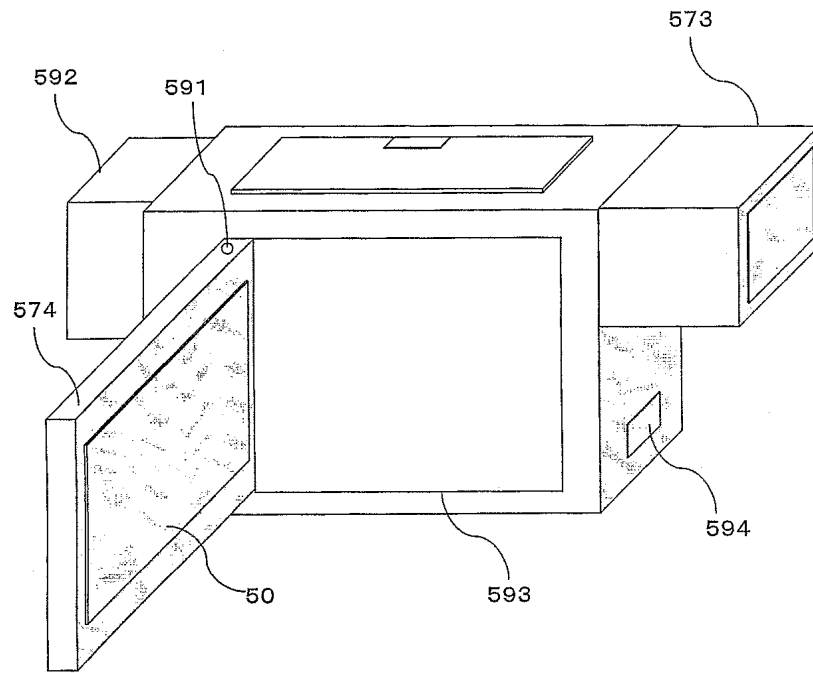
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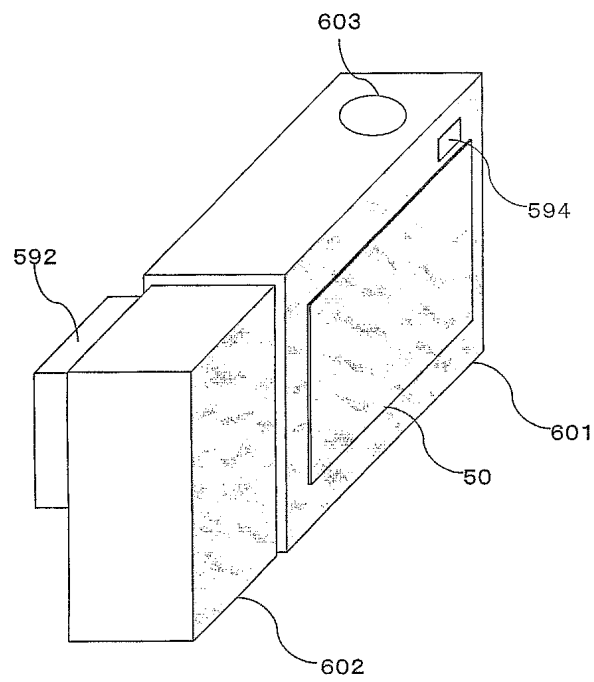
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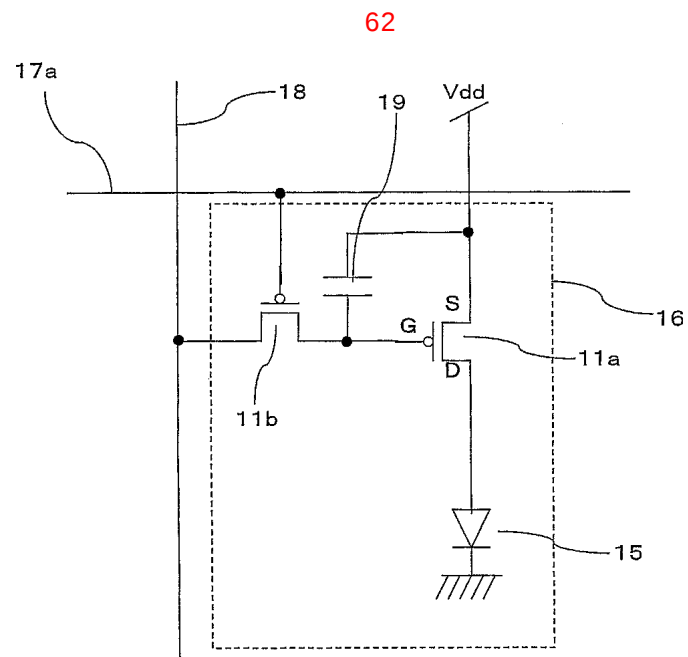
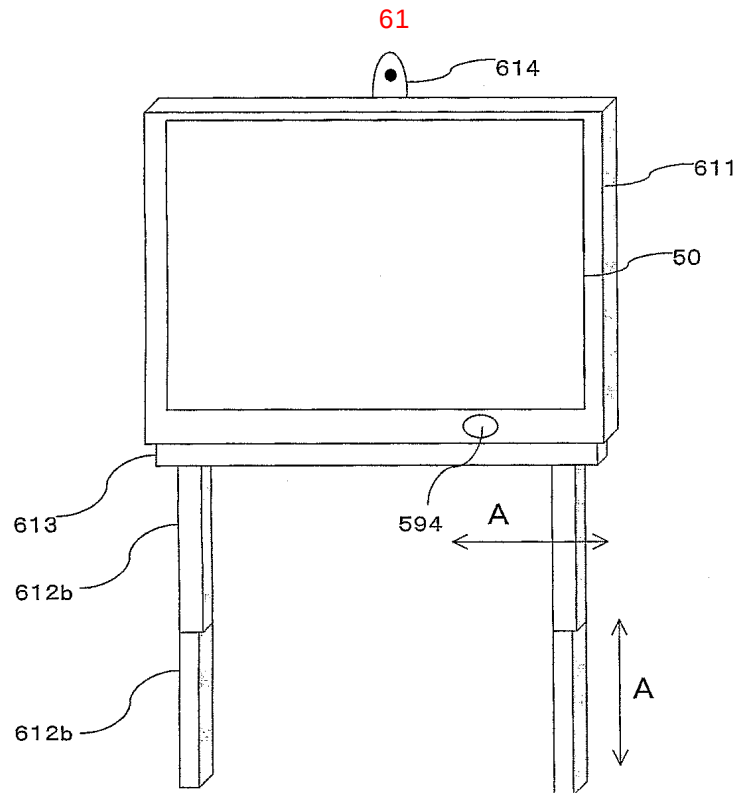


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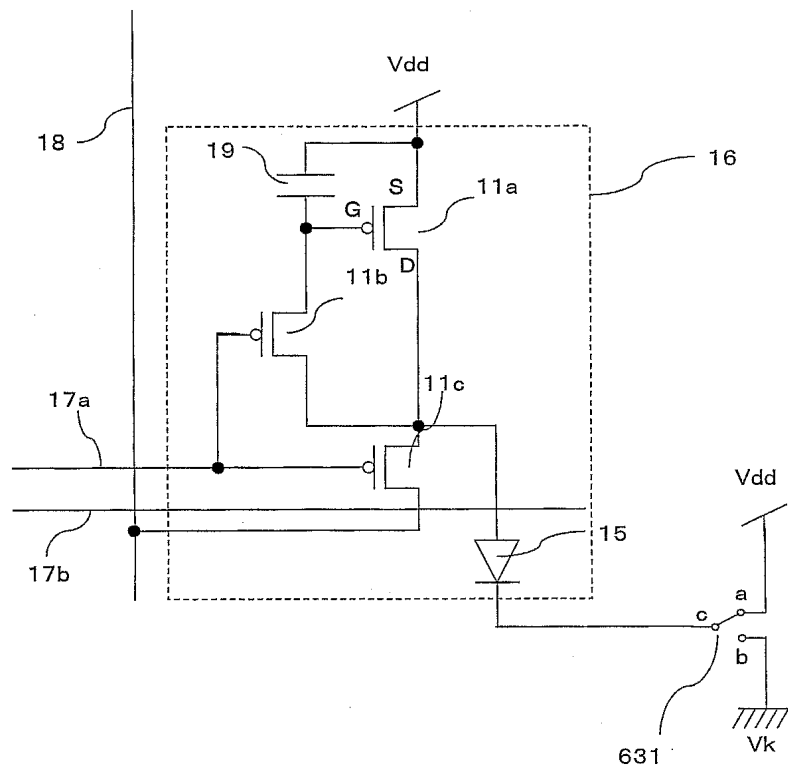


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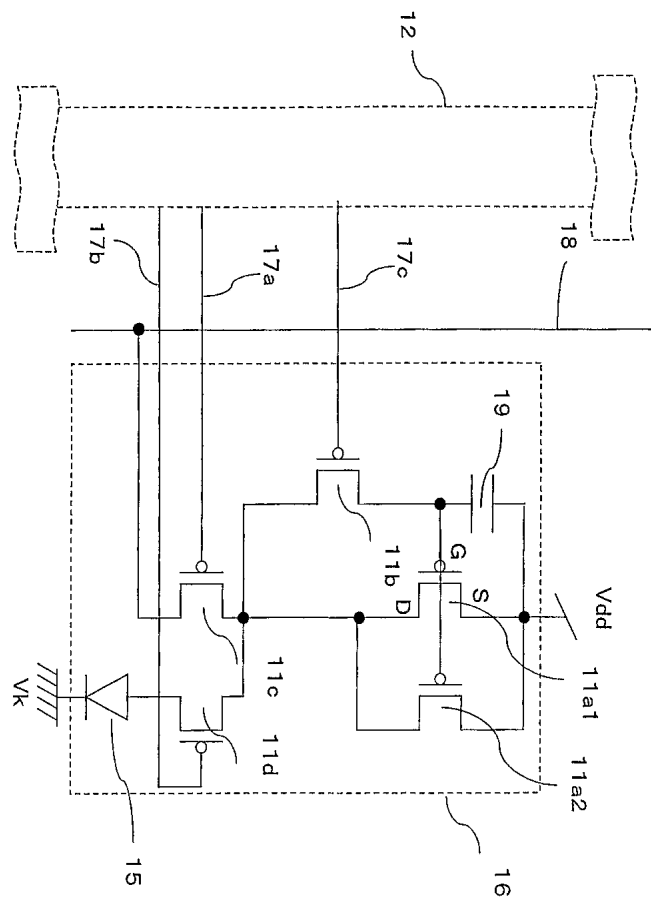




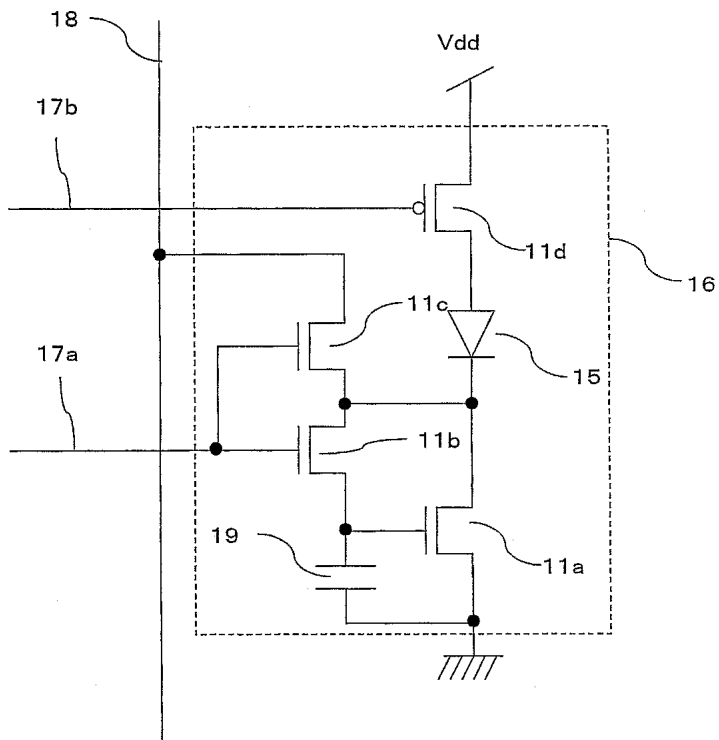
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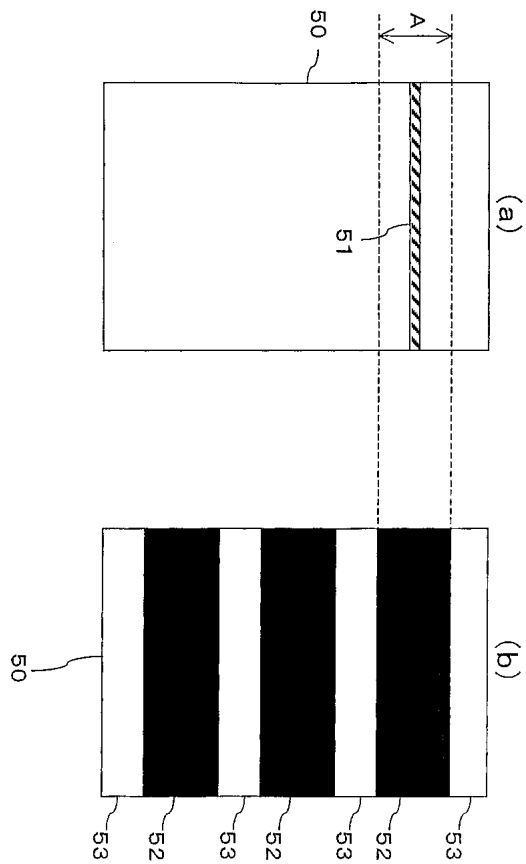
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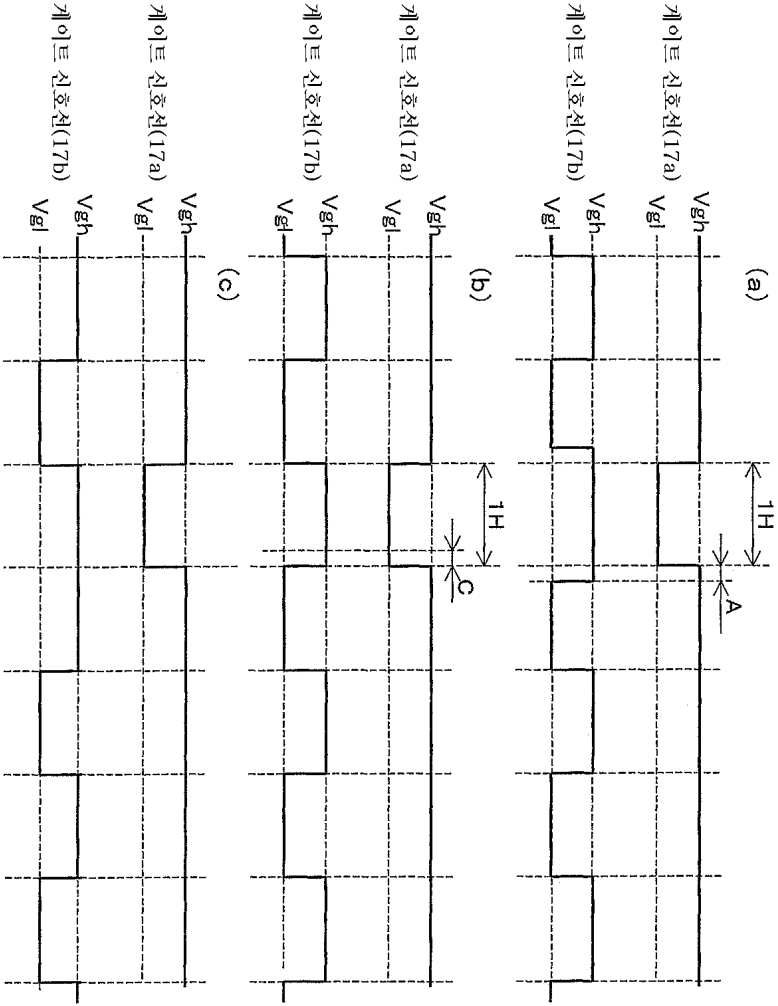
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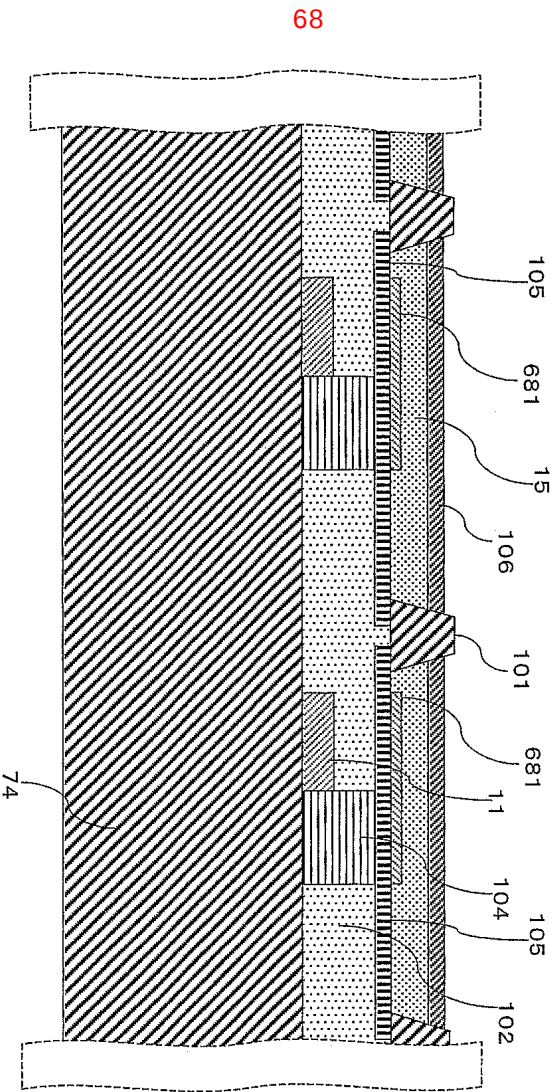


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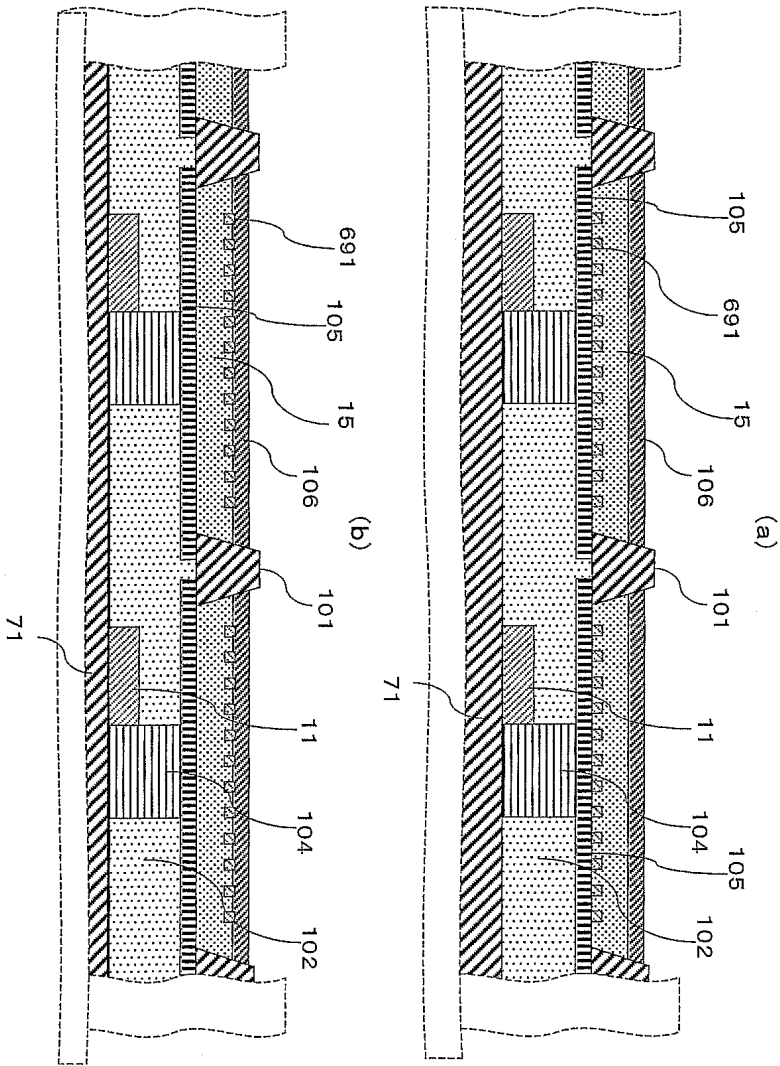


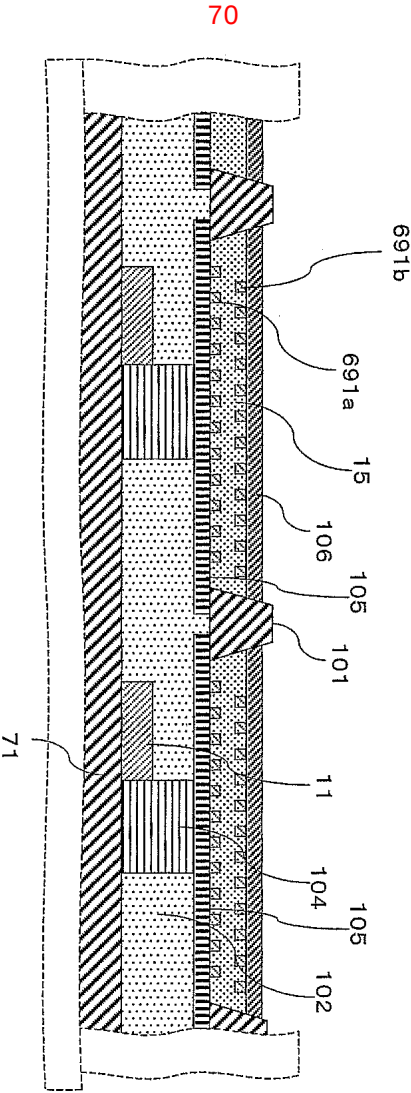
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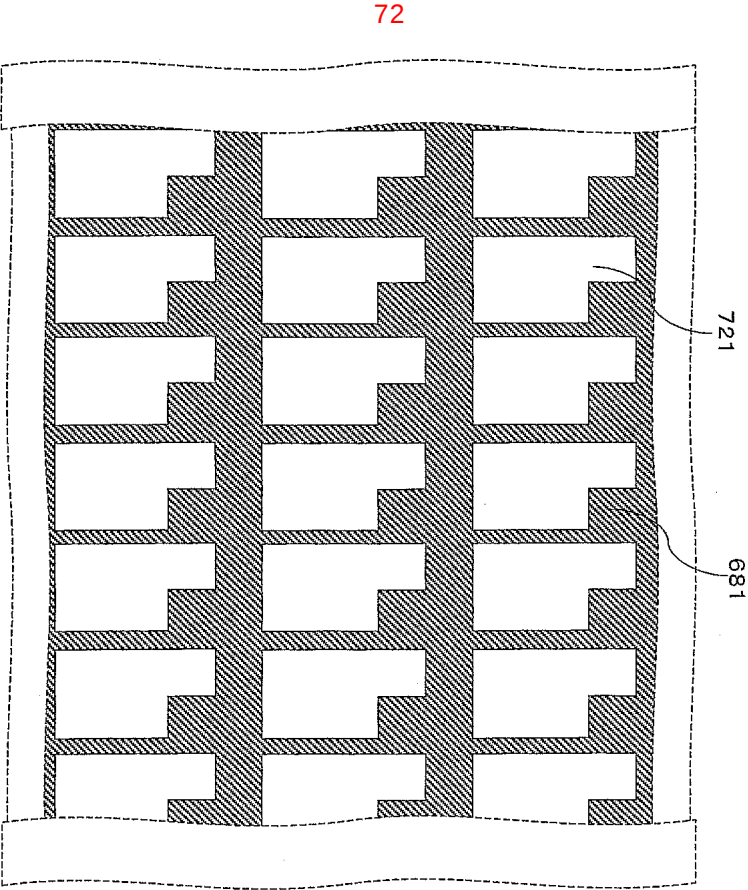
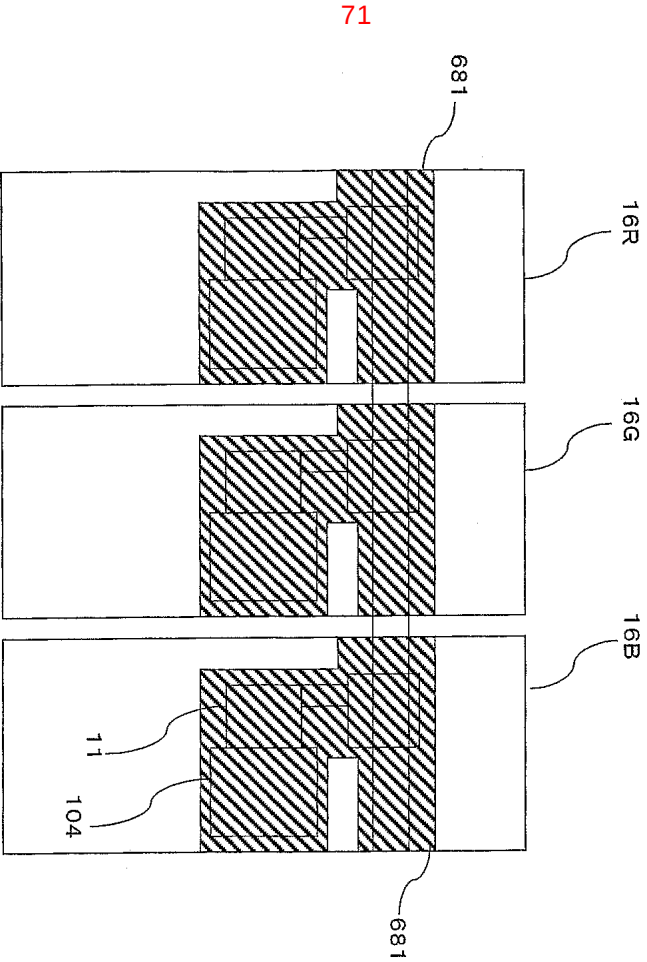




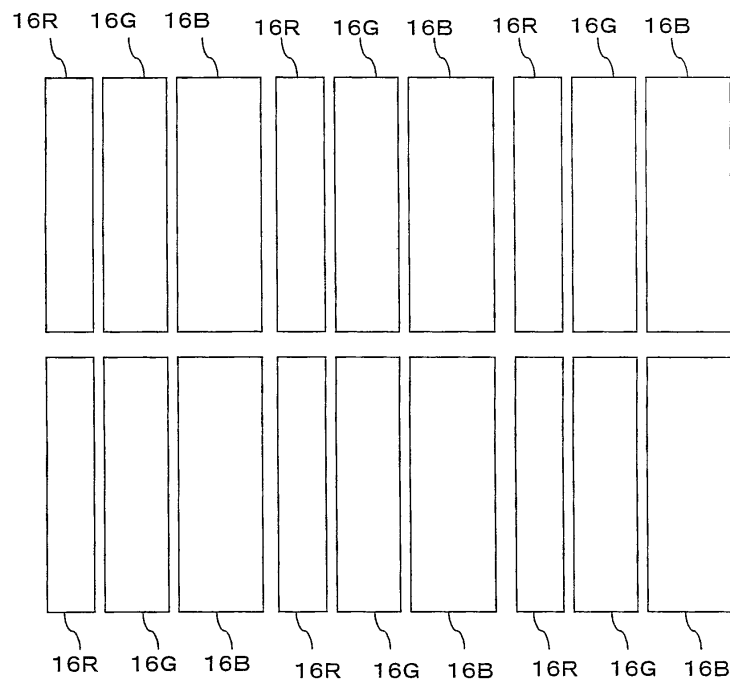
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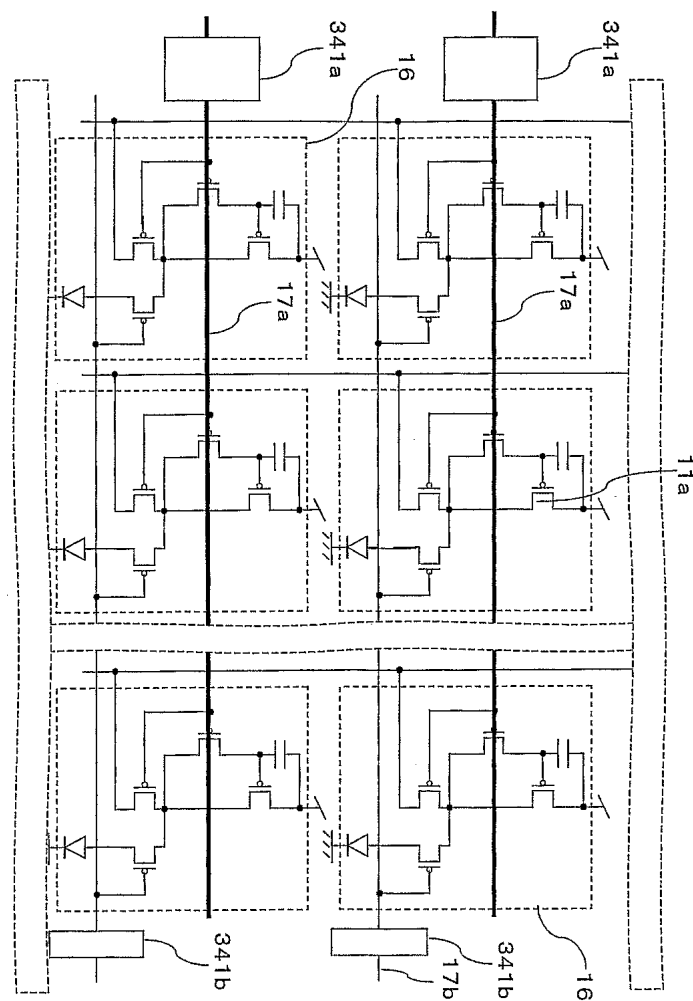


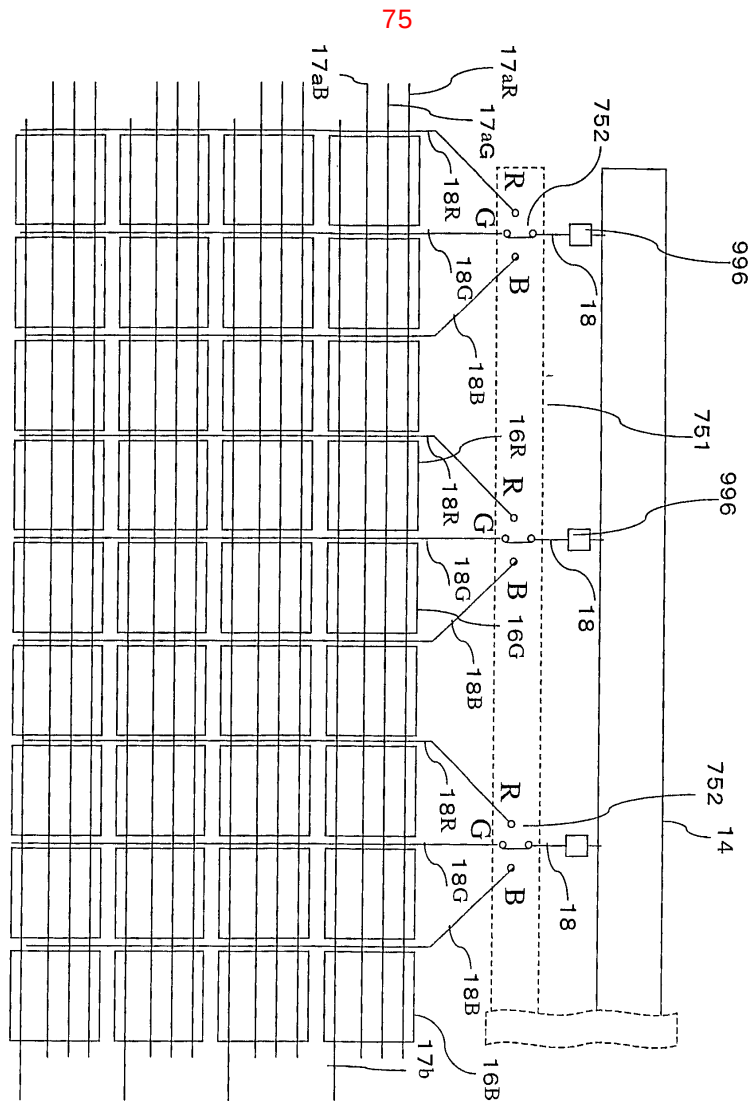


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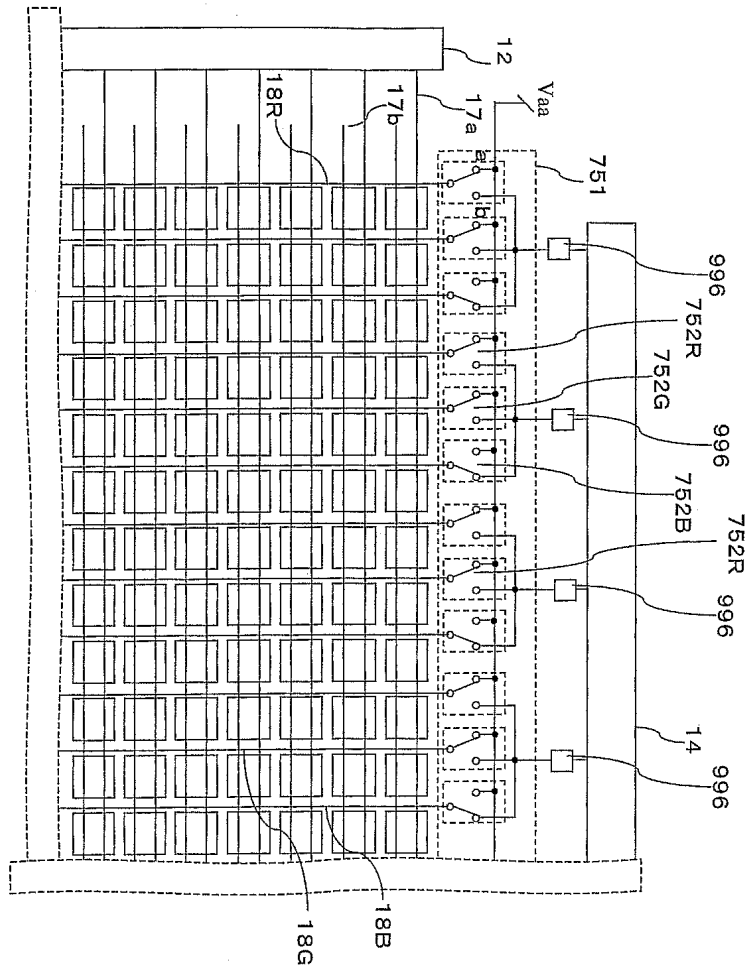


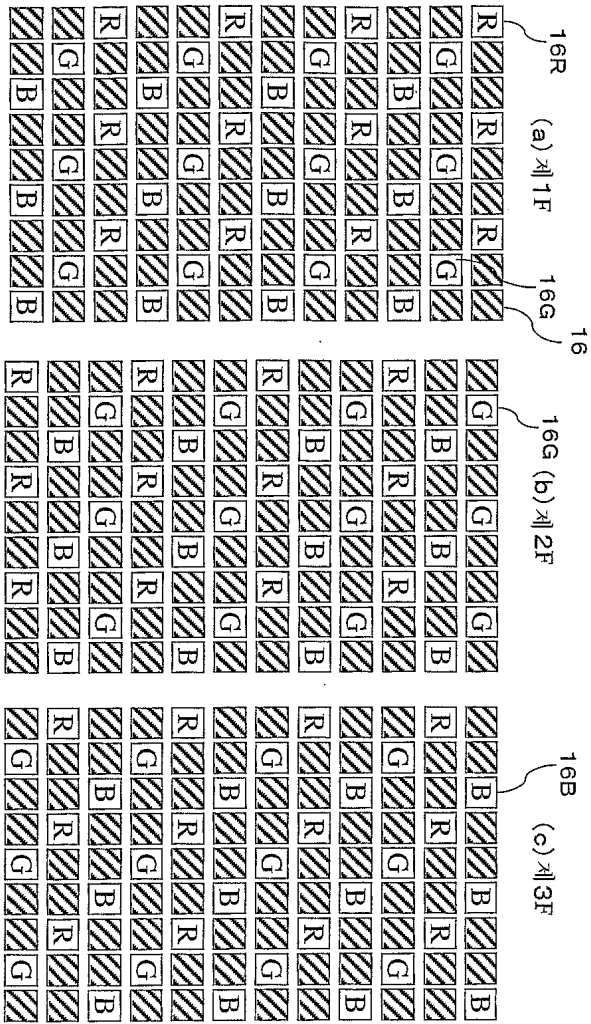
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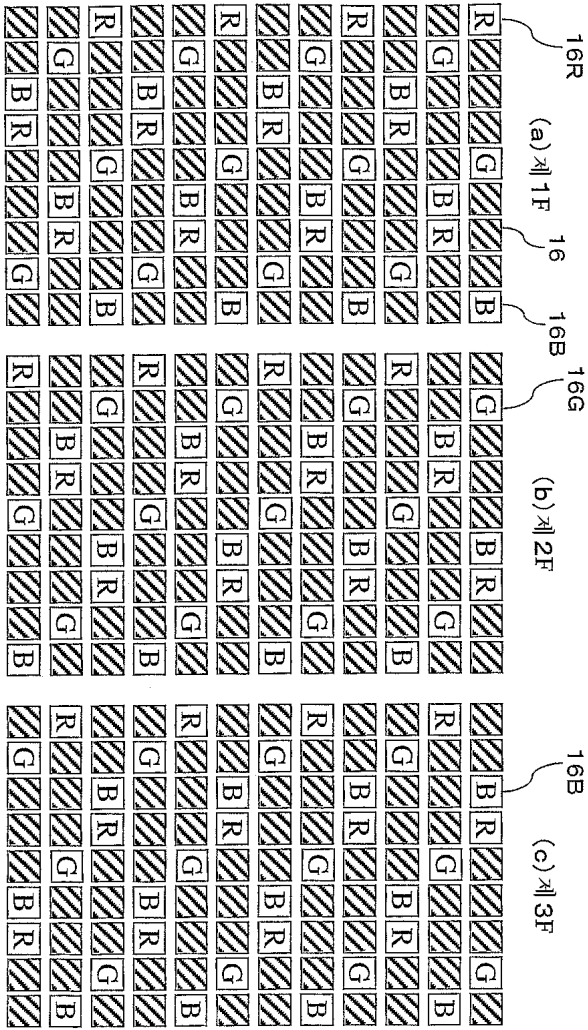




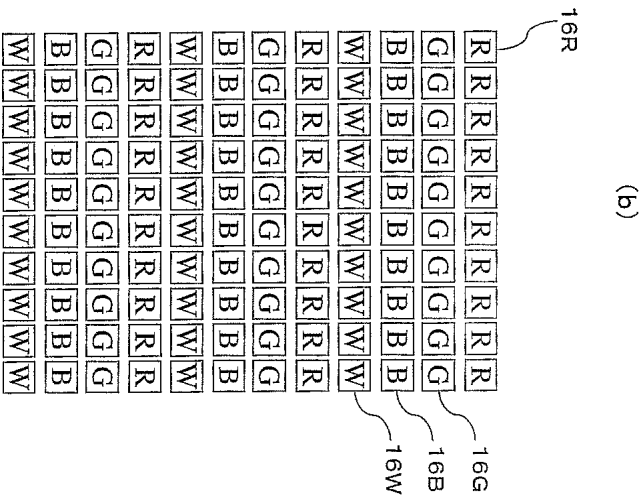
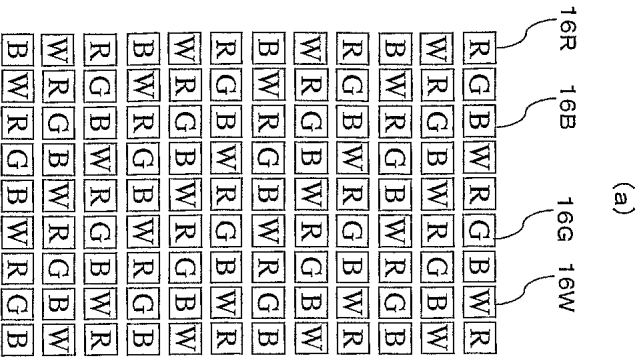
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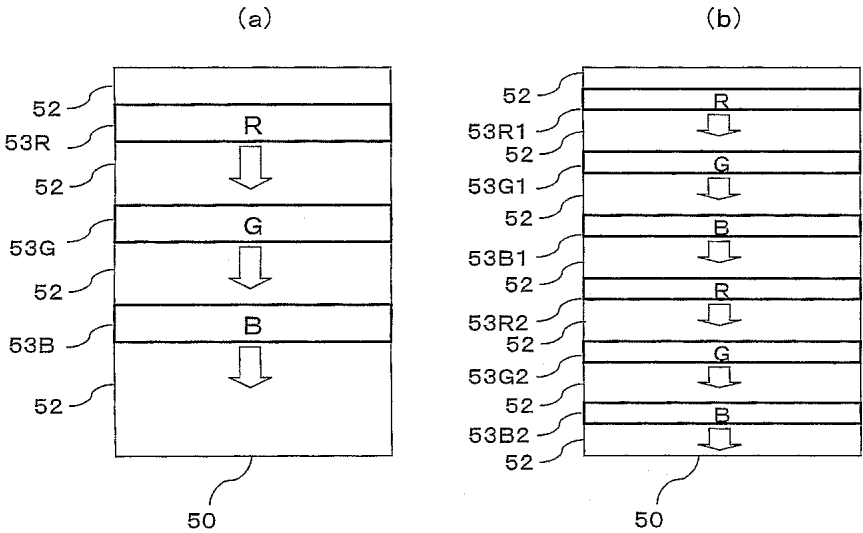




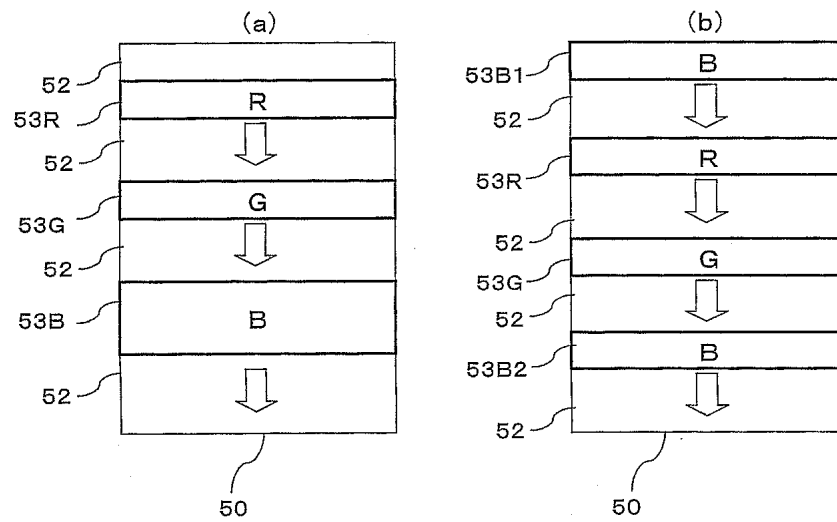
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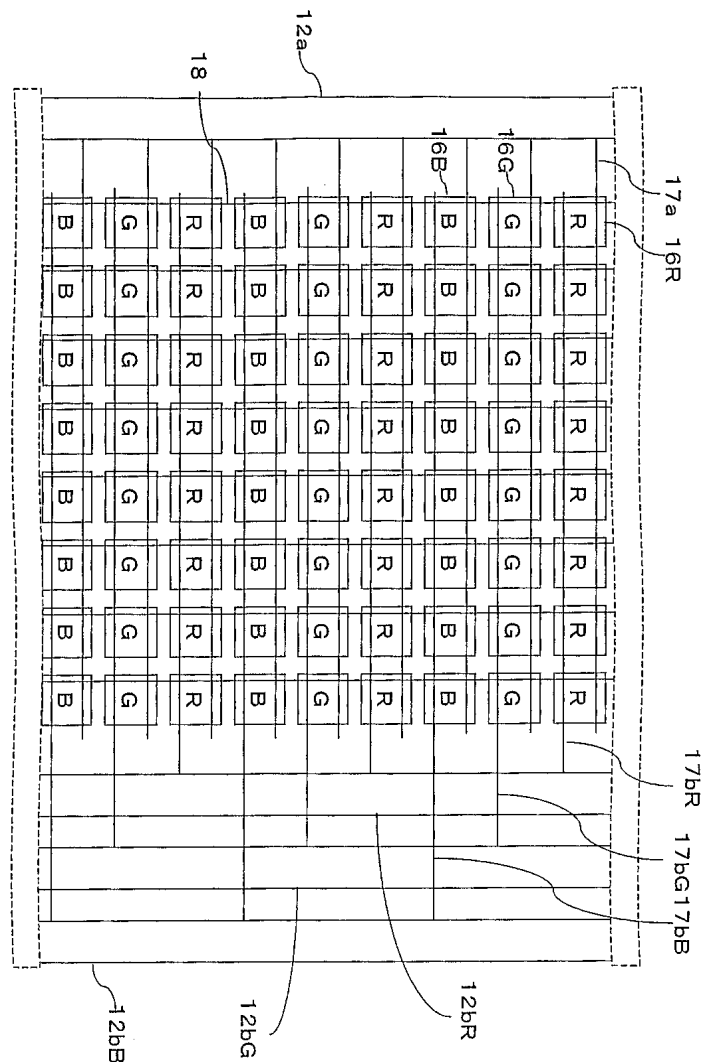
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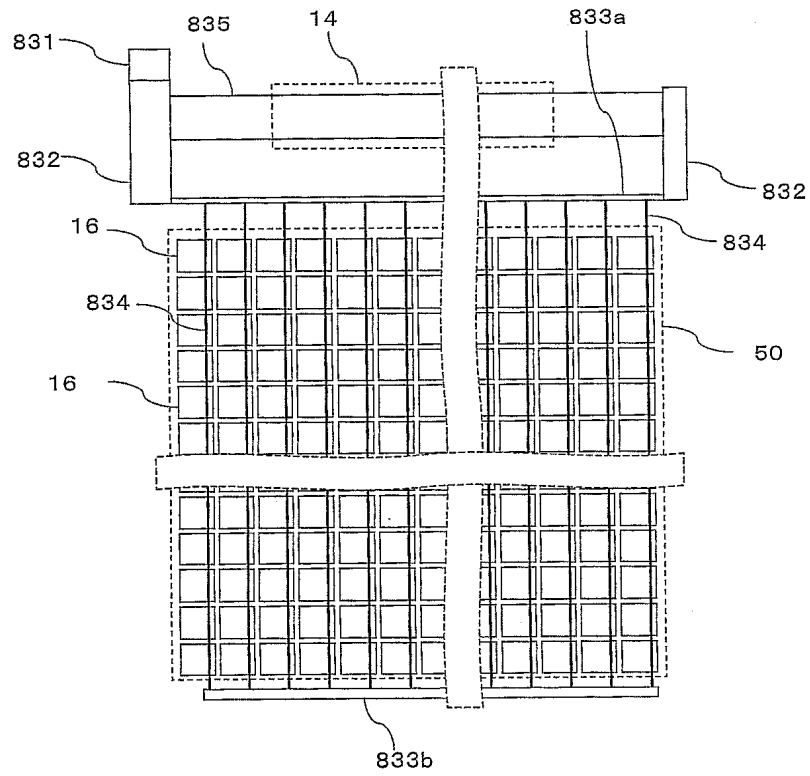
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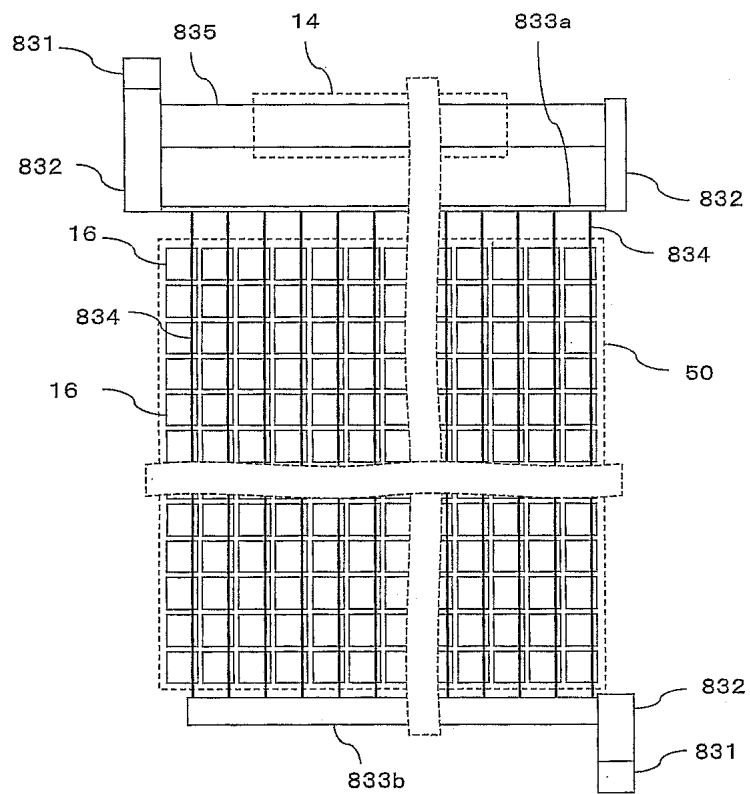
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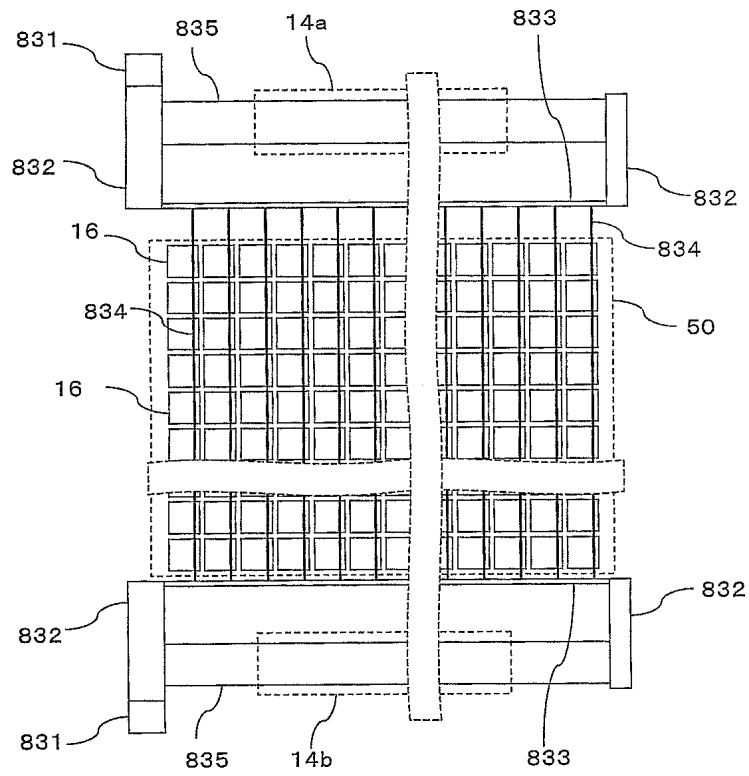
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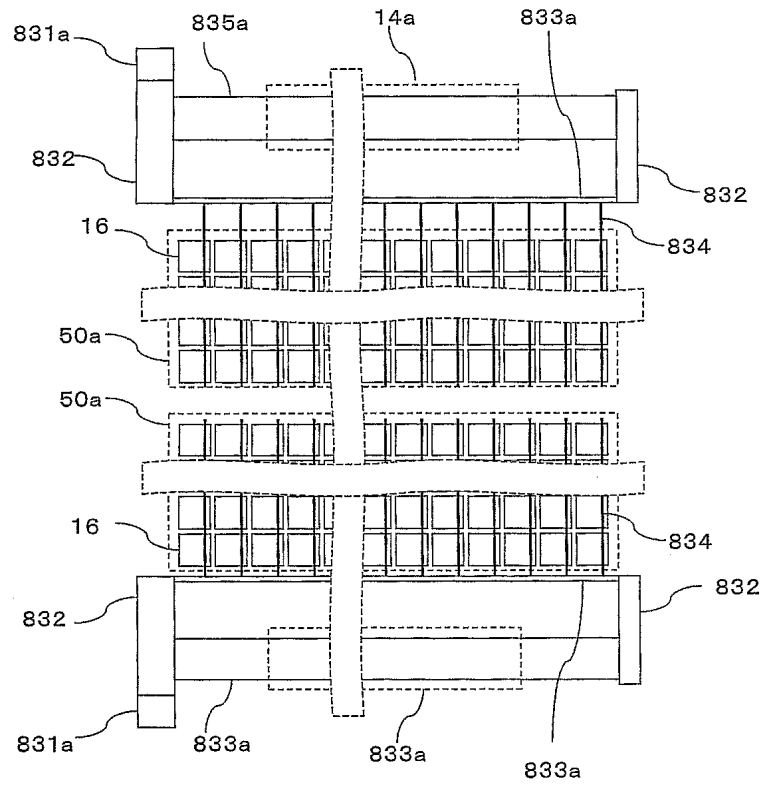
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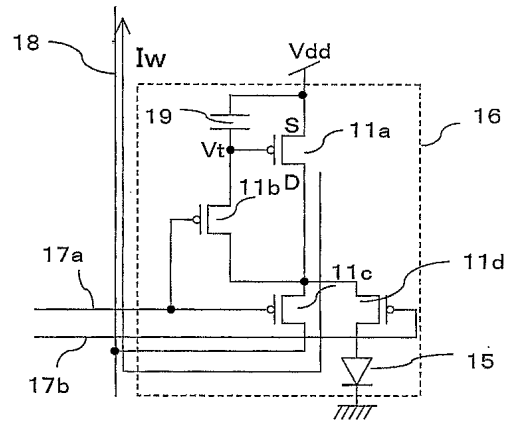
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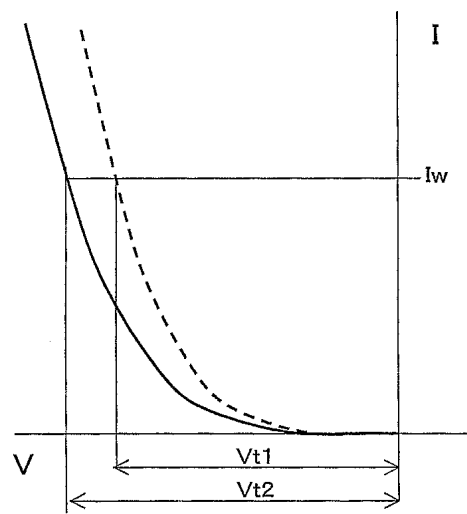
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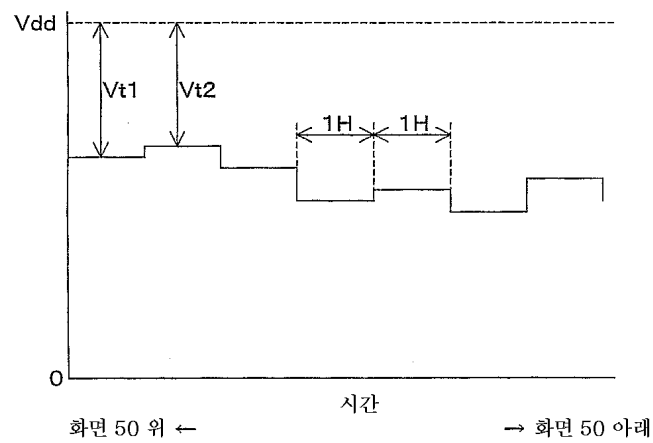


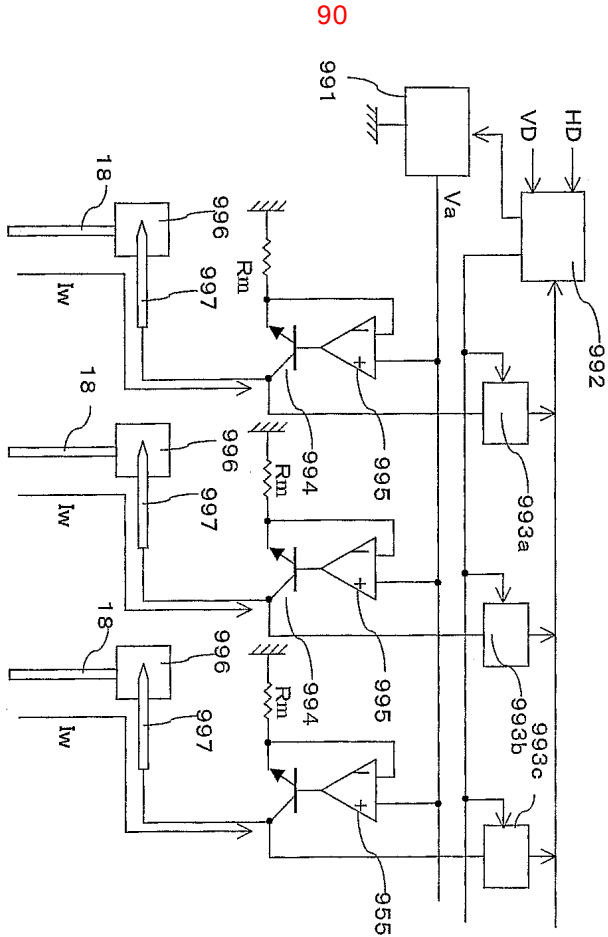
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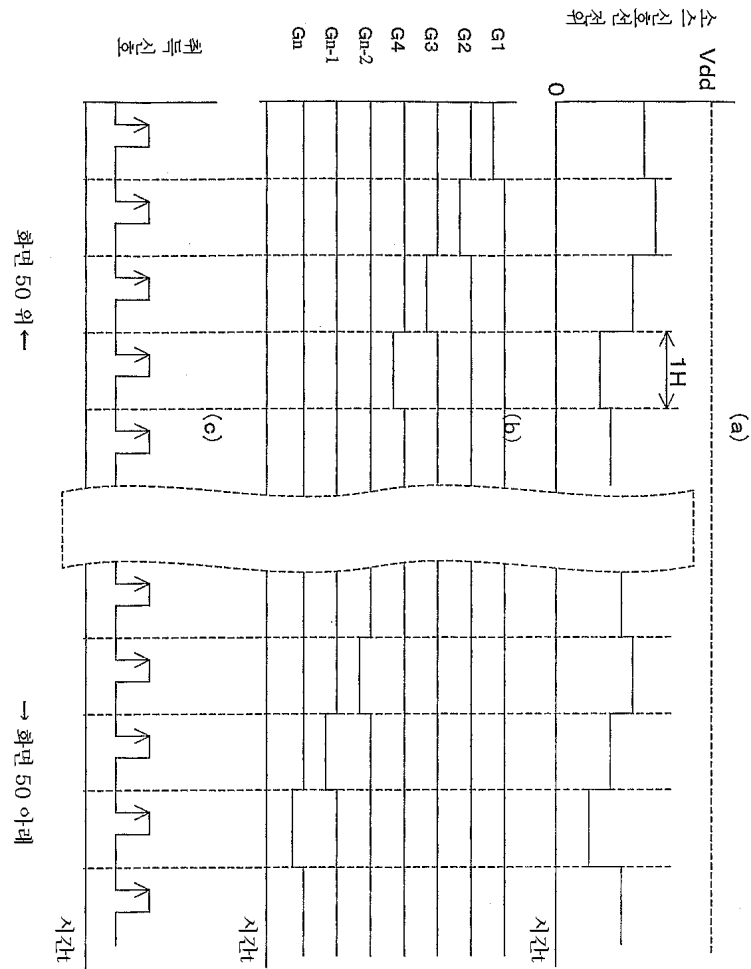
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전류 I_w 를 인가할 때의 소스 신호선 전위

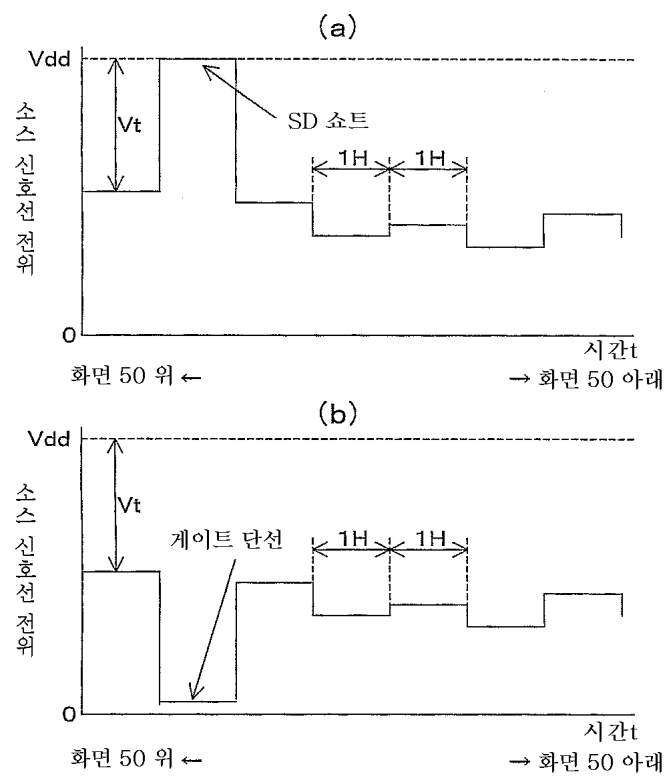




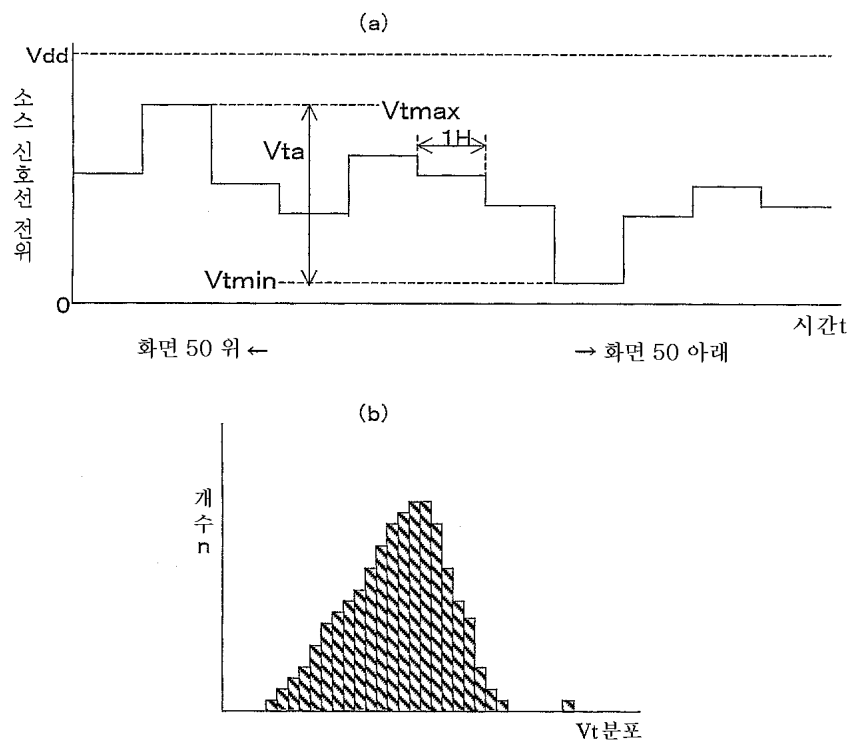
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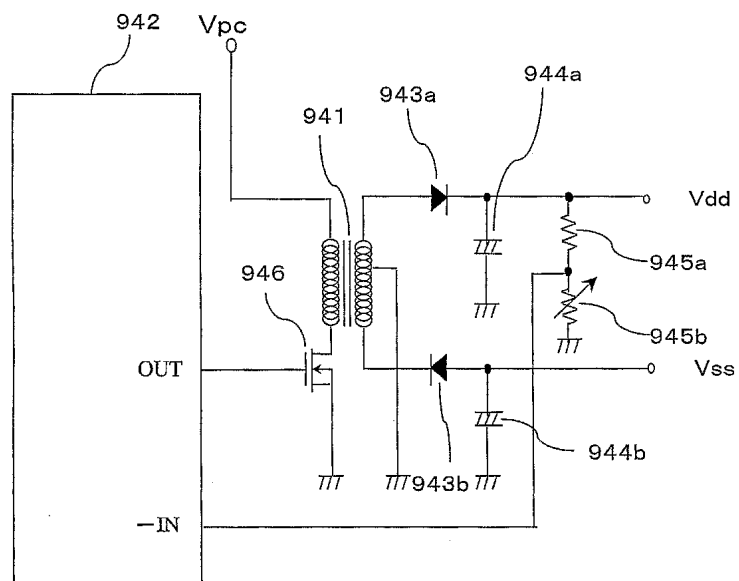
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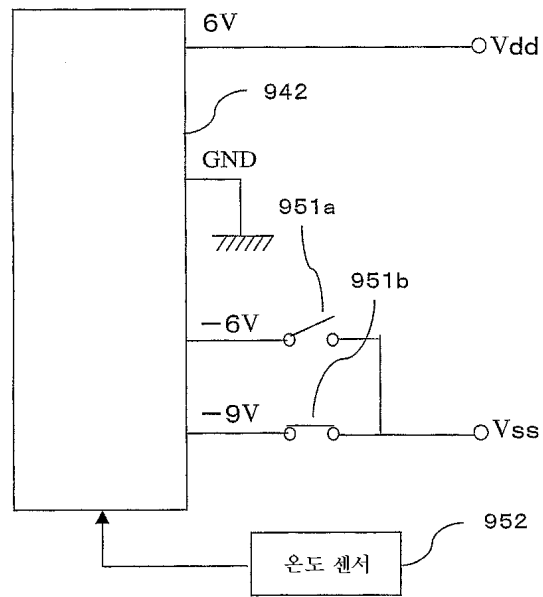
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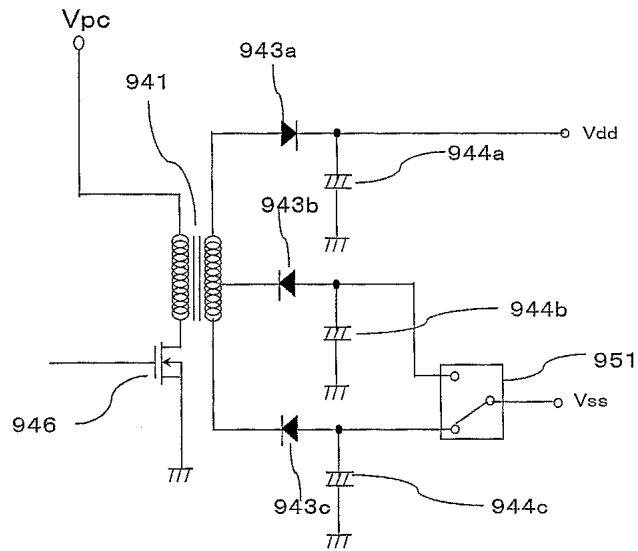
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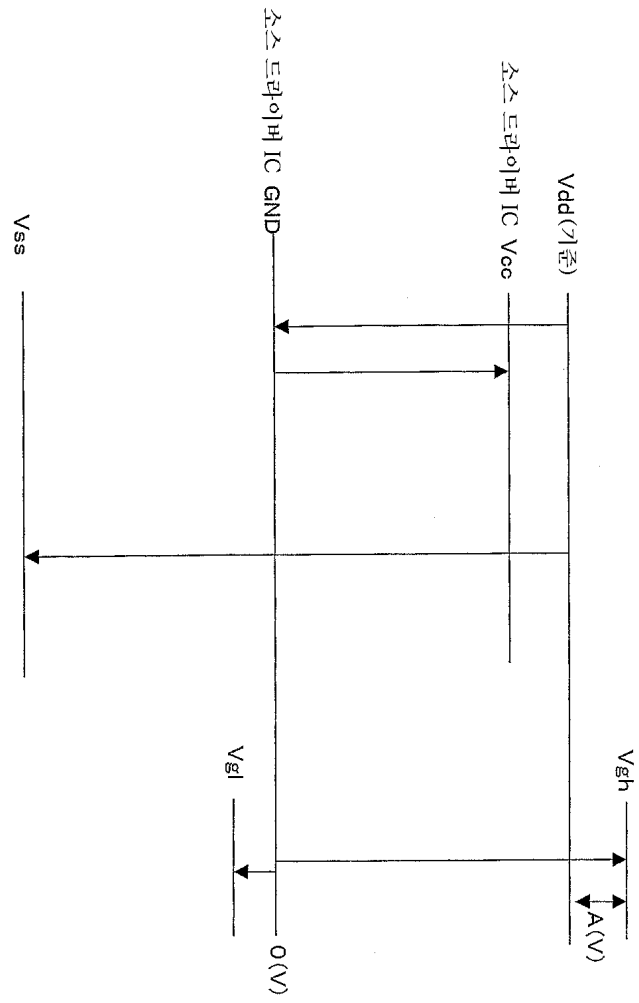


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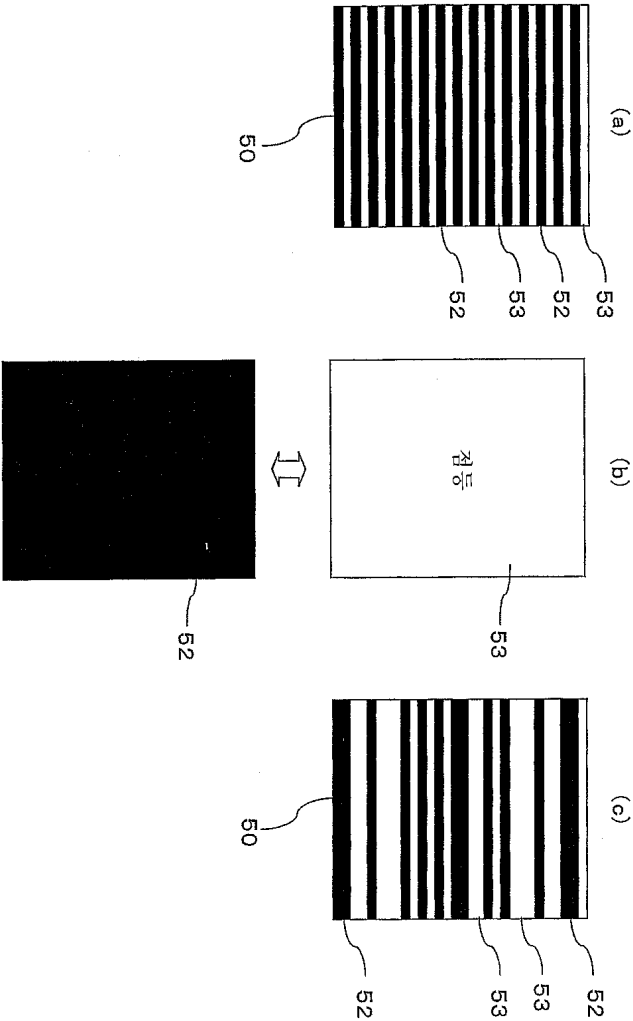


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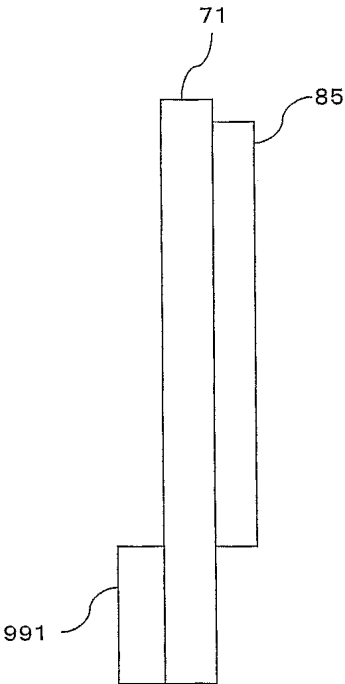


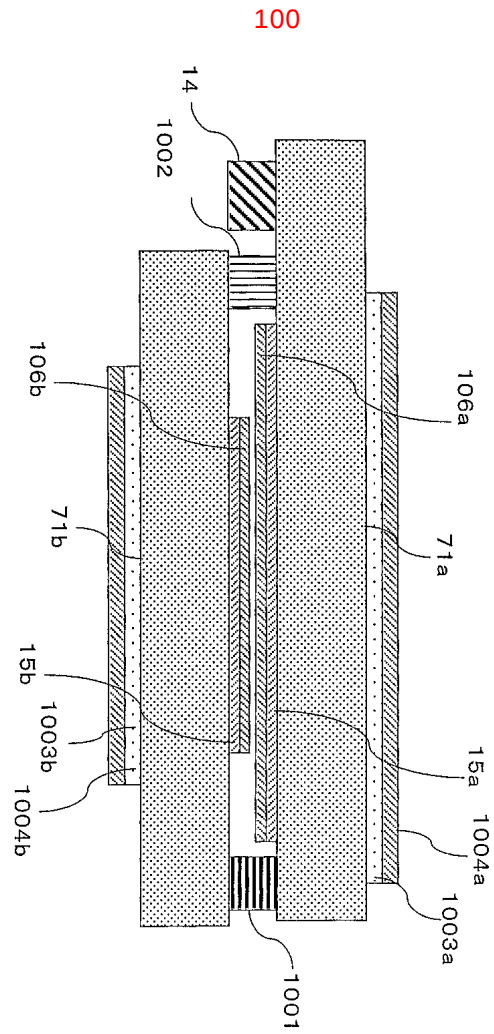


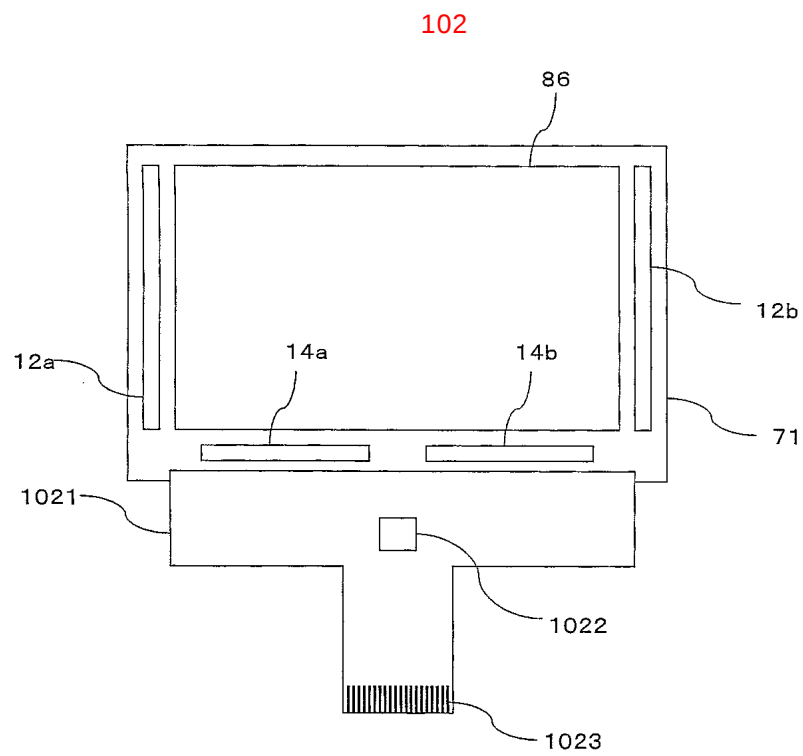
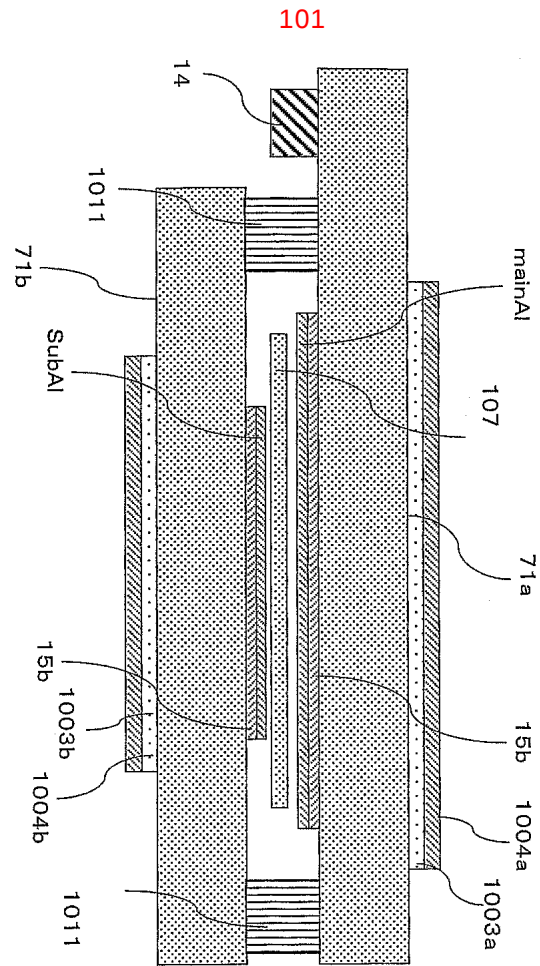
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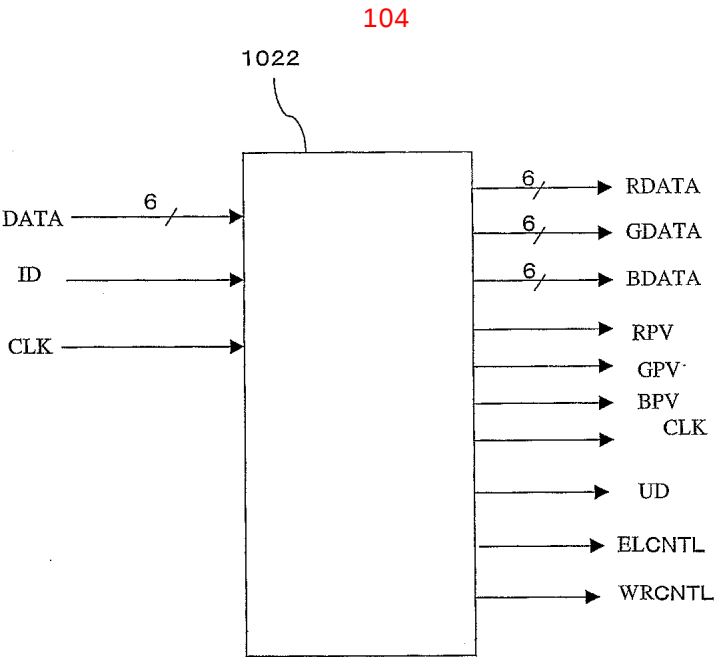
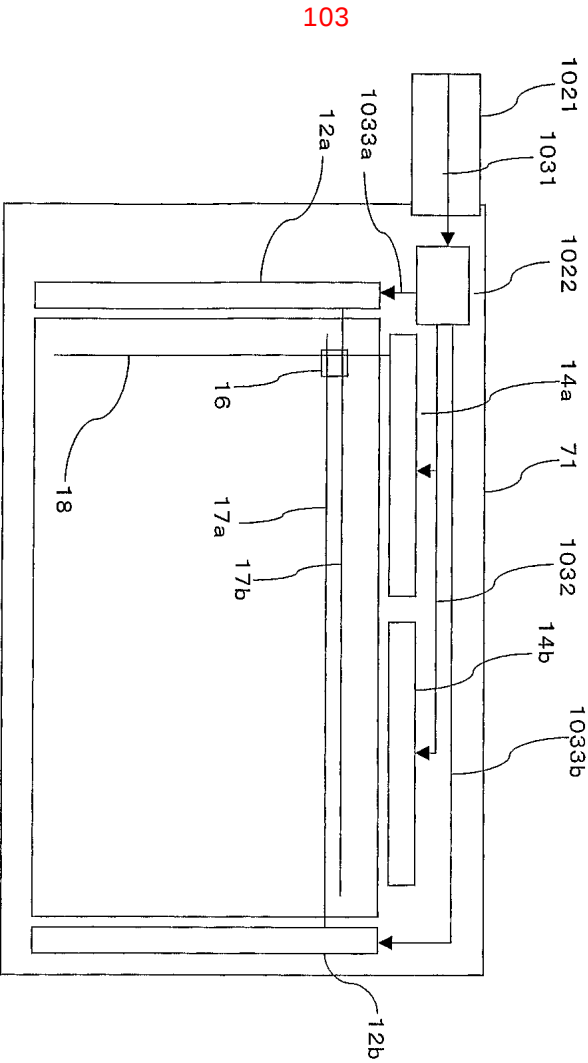


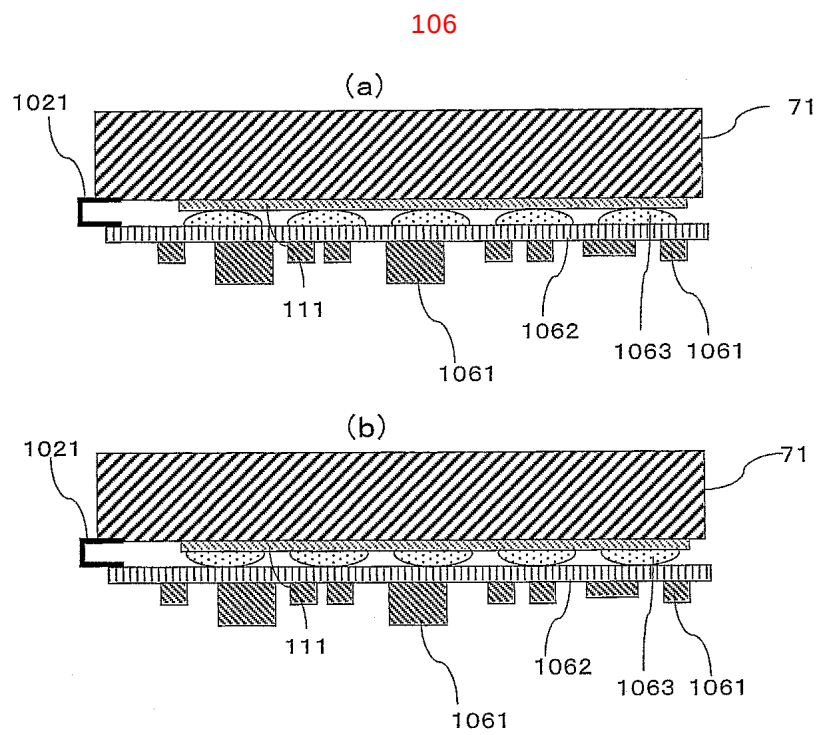
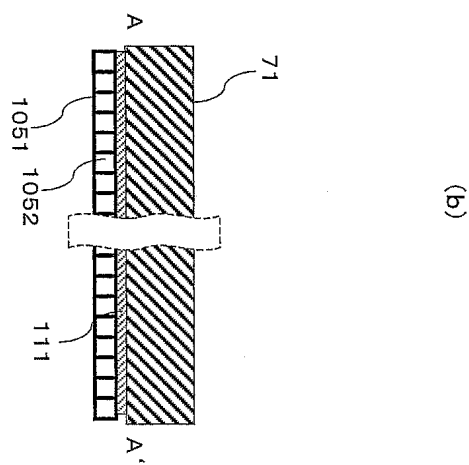
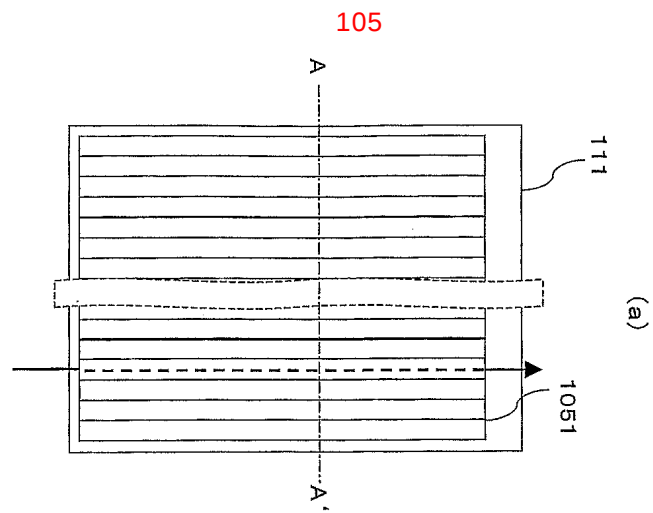
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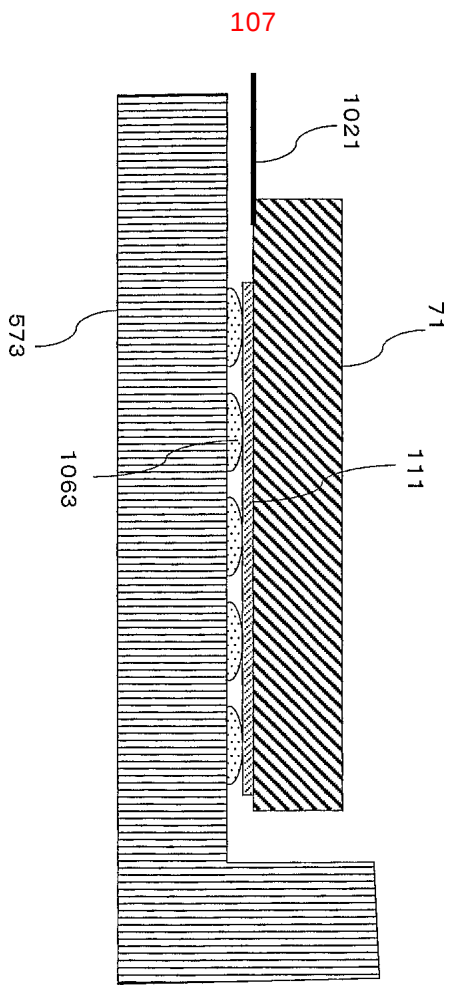




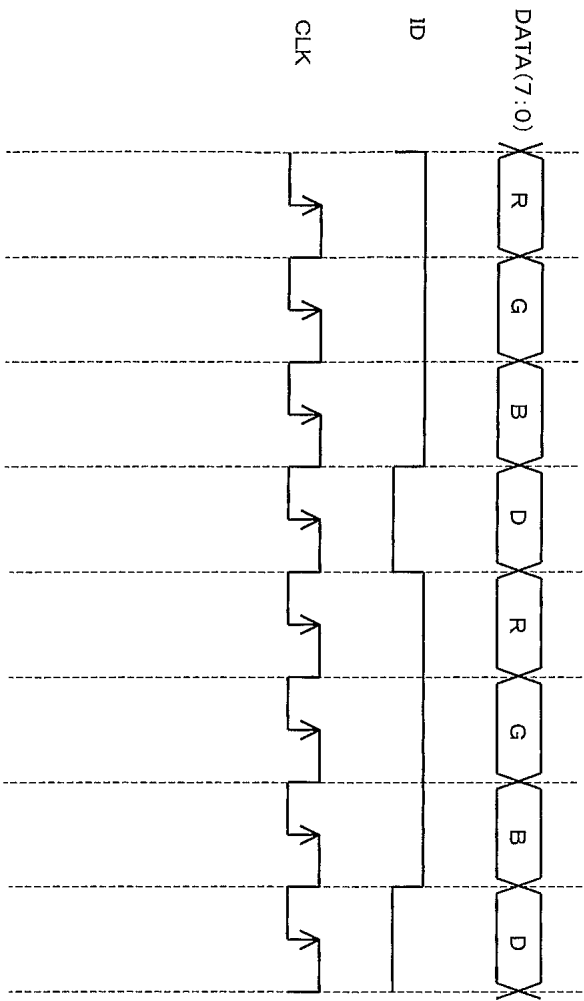




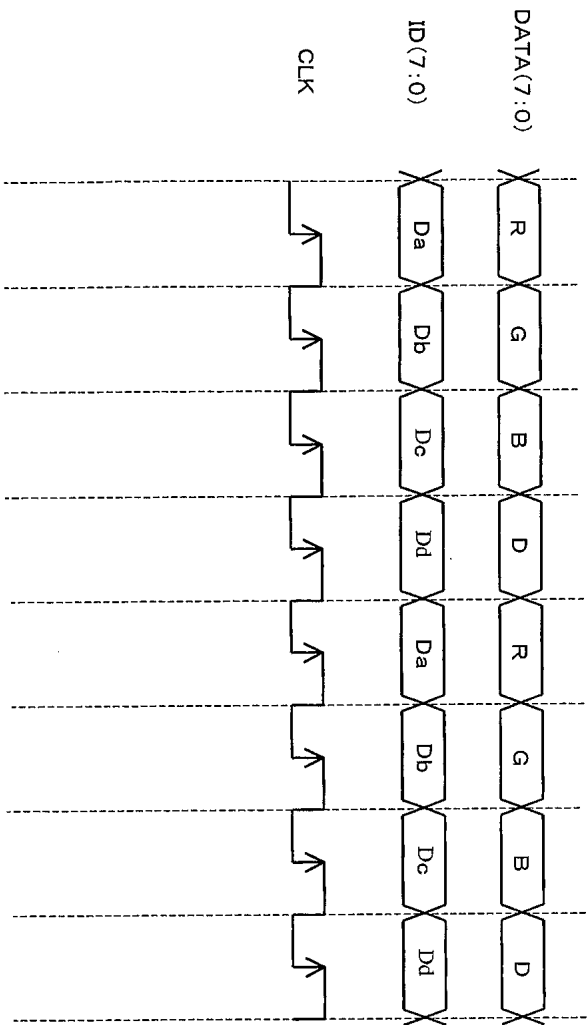


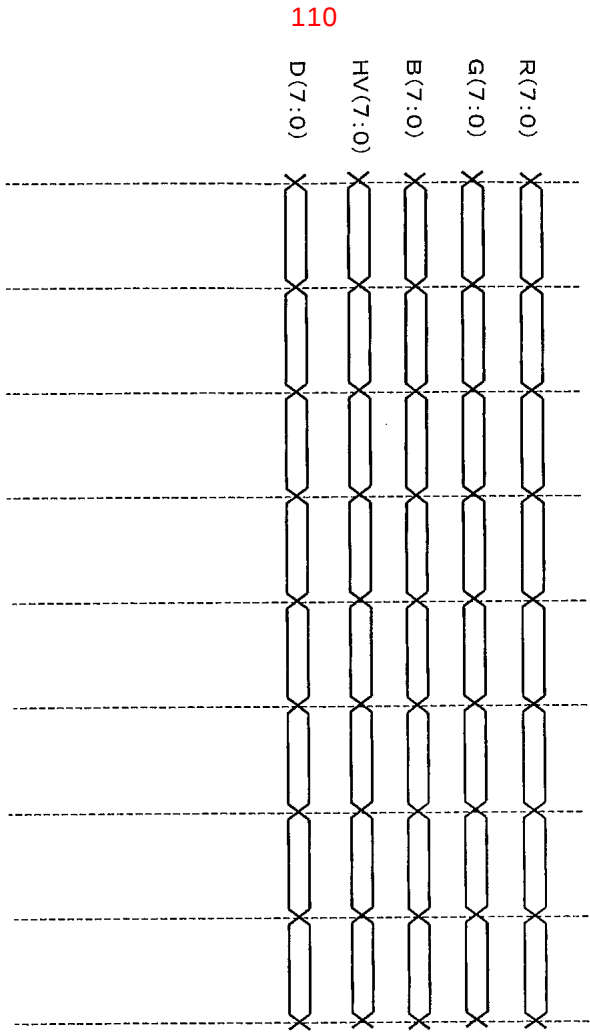


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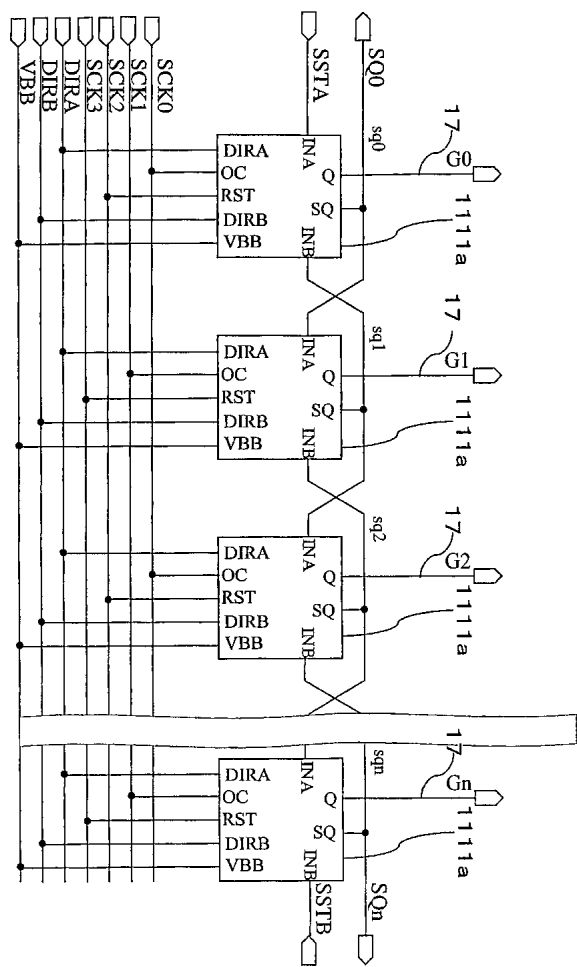


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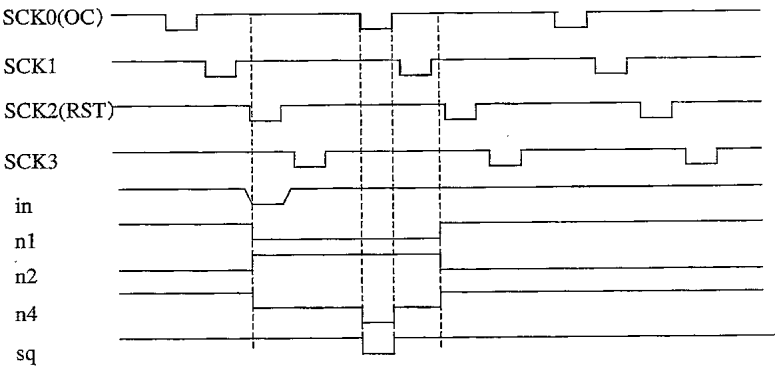




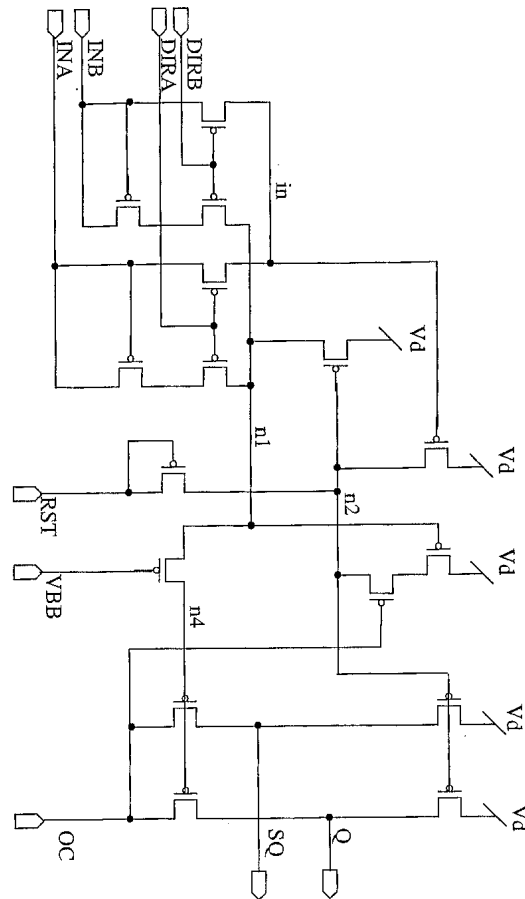
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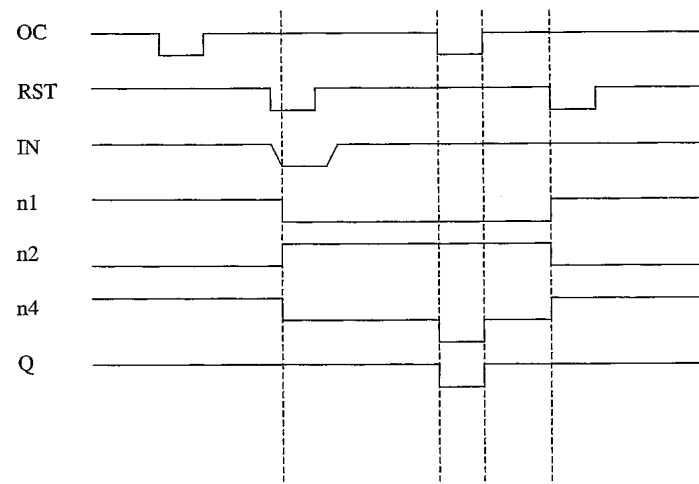
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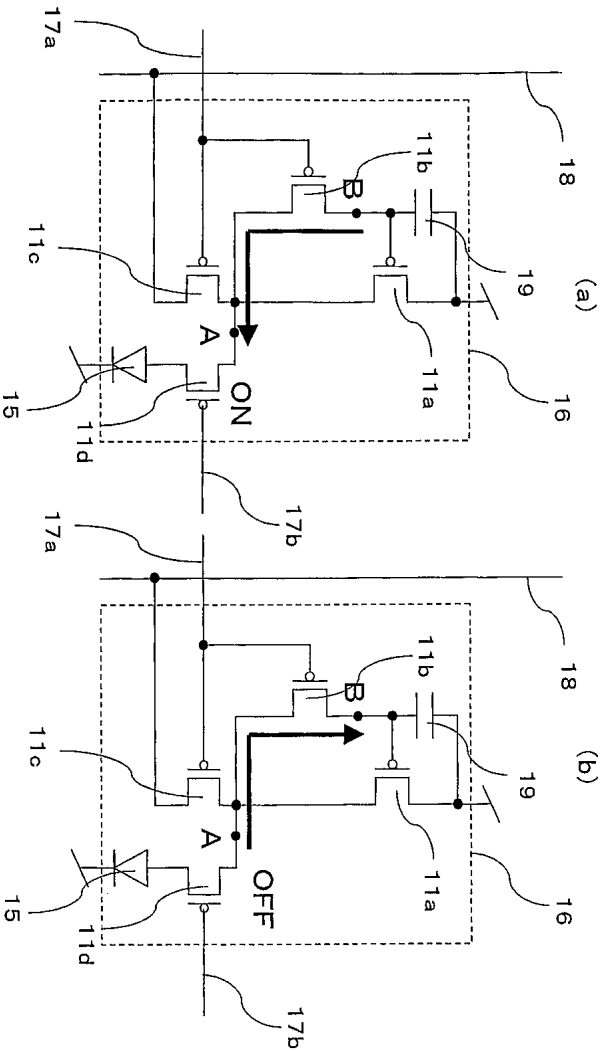
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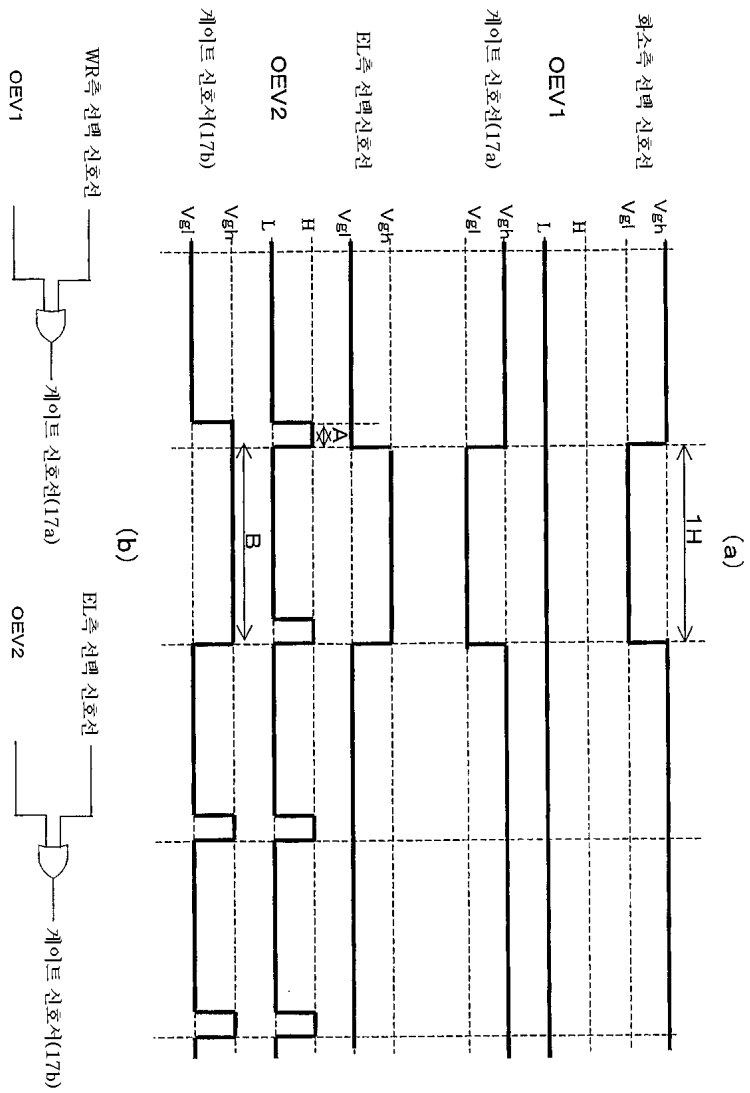


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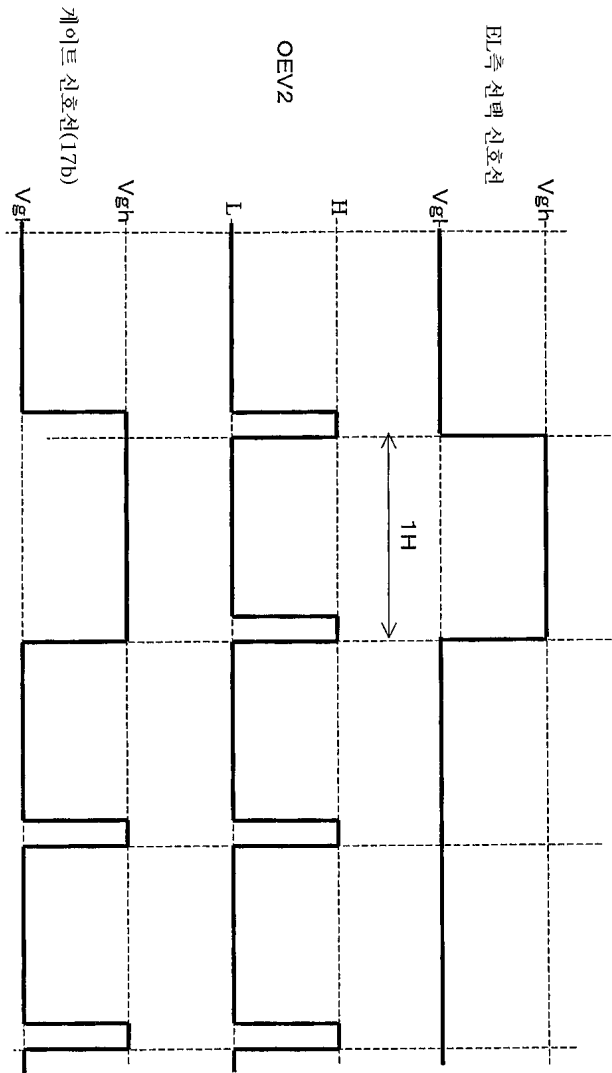


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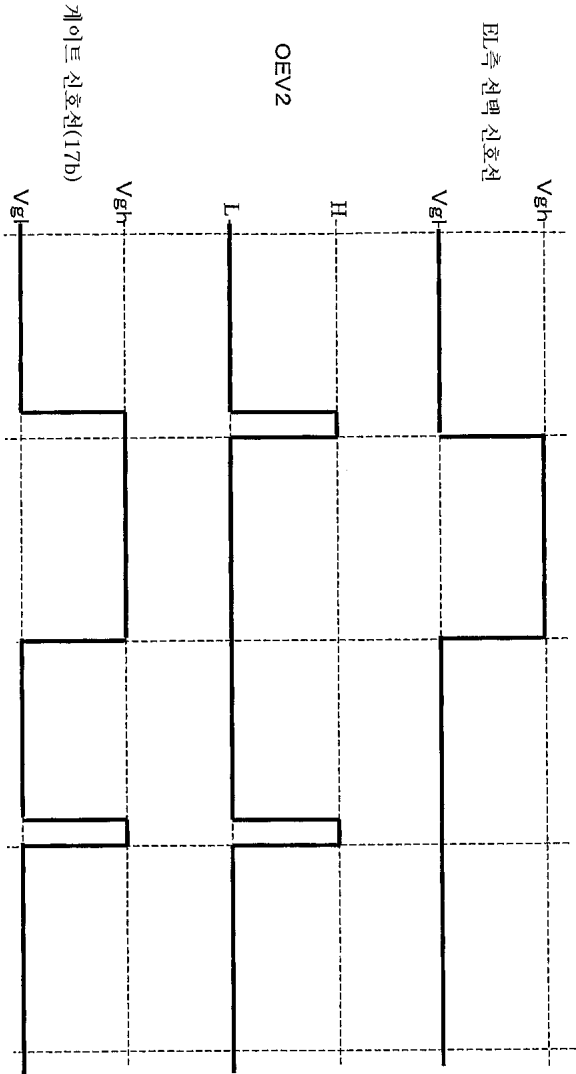




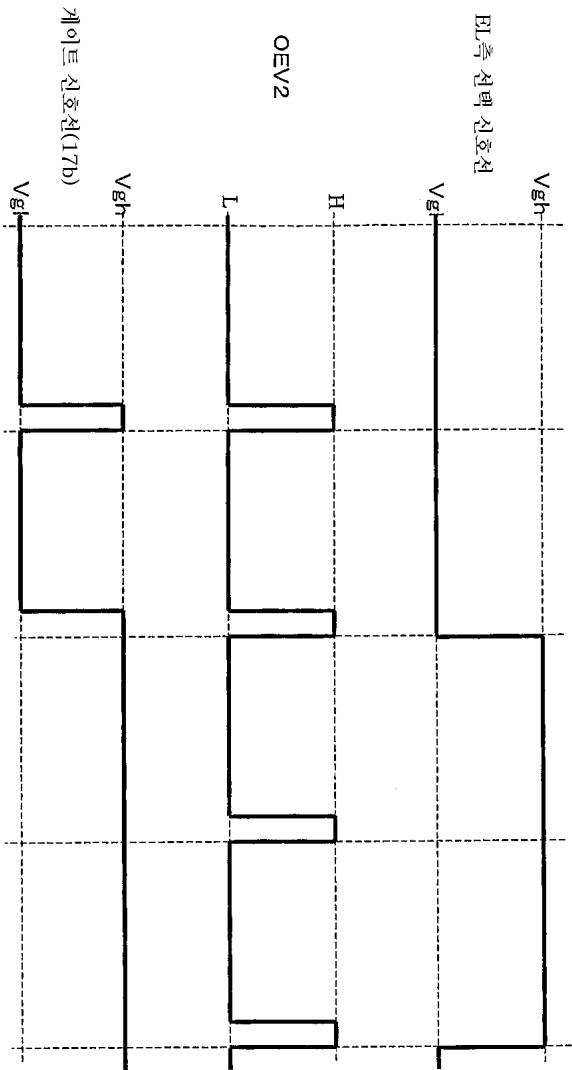
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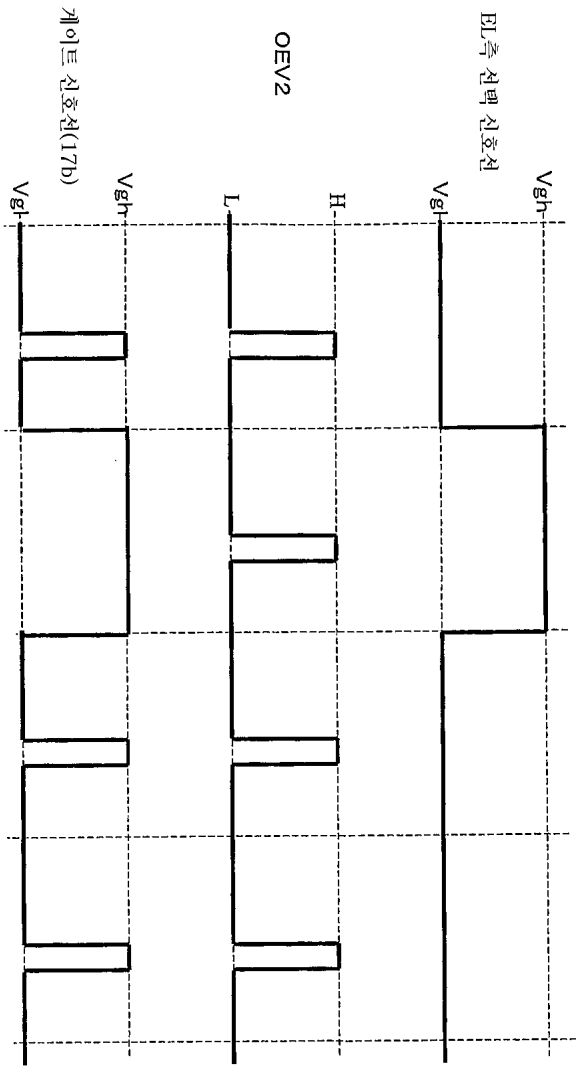
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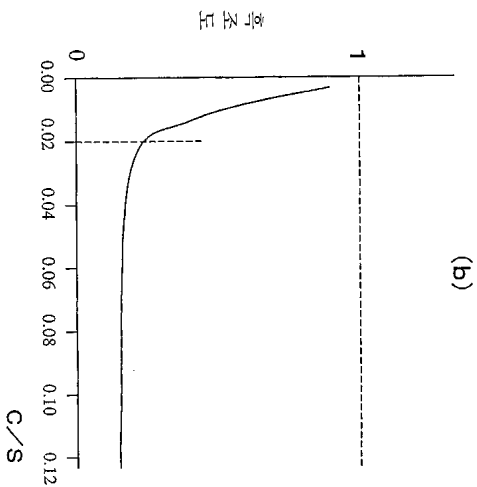
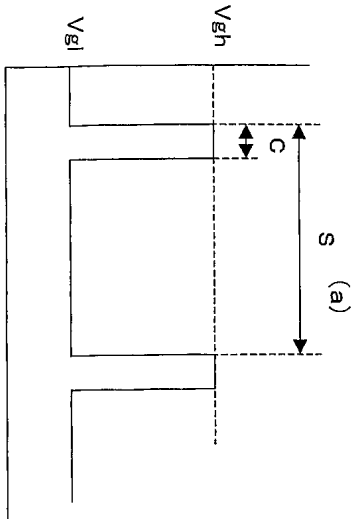
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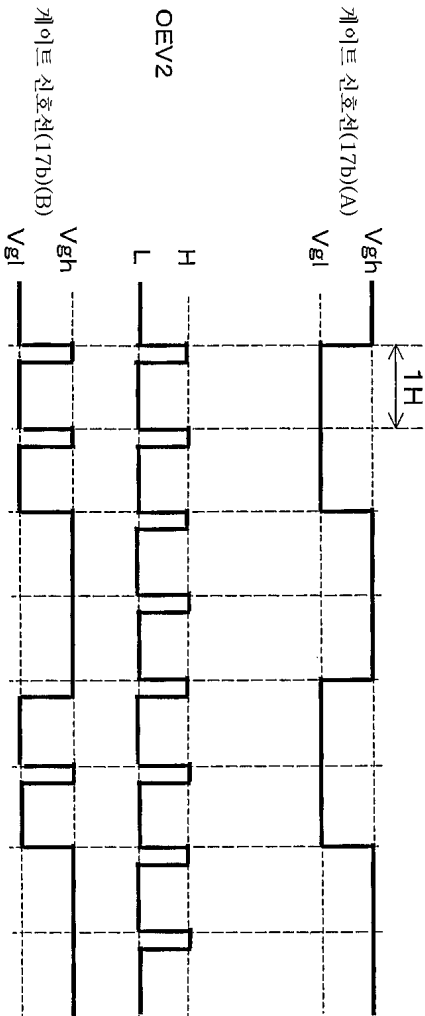
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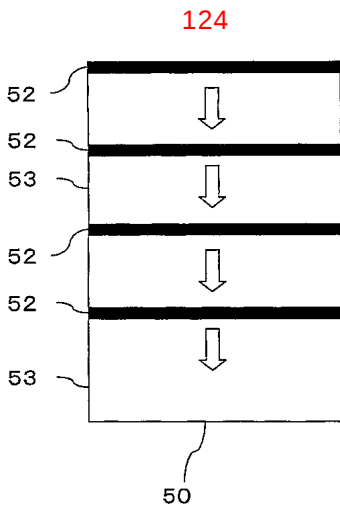
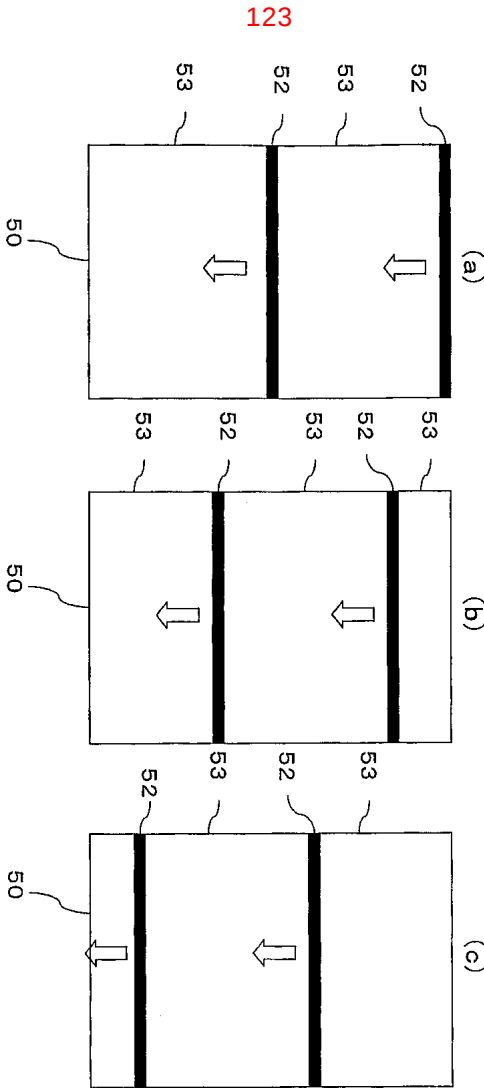


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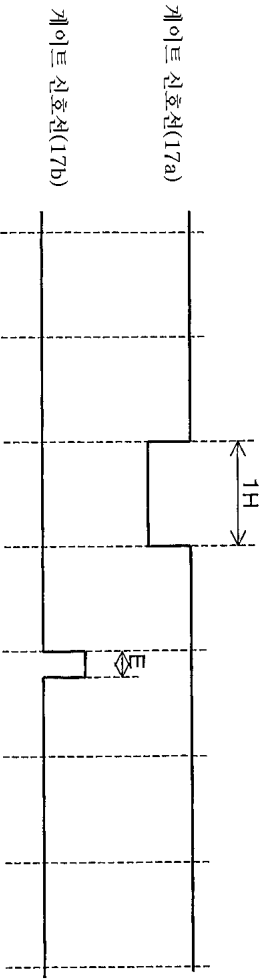


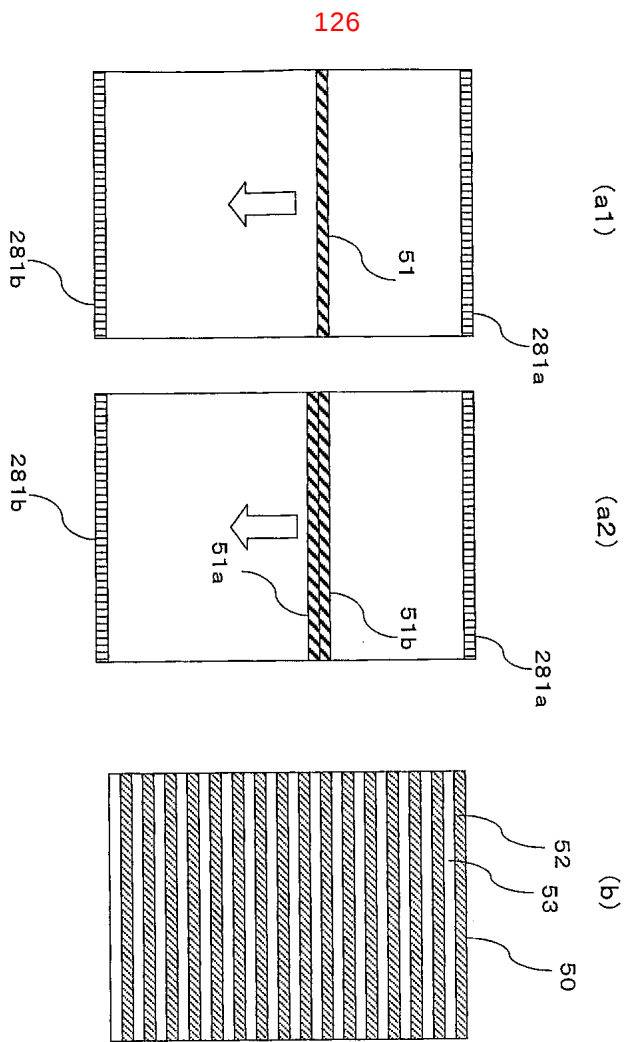
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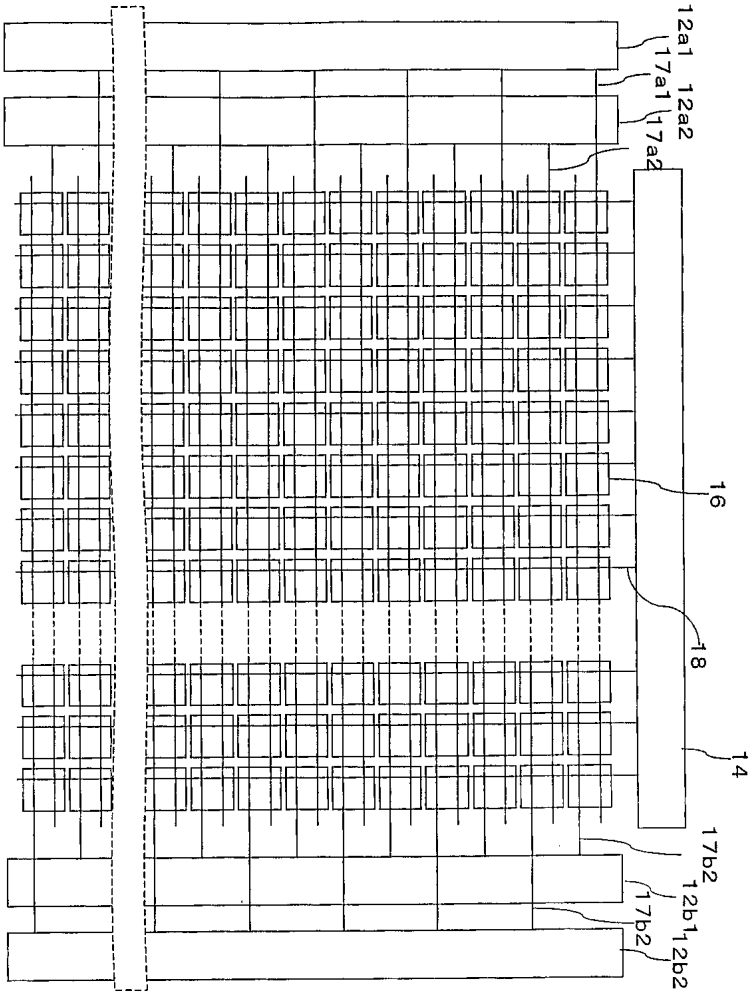


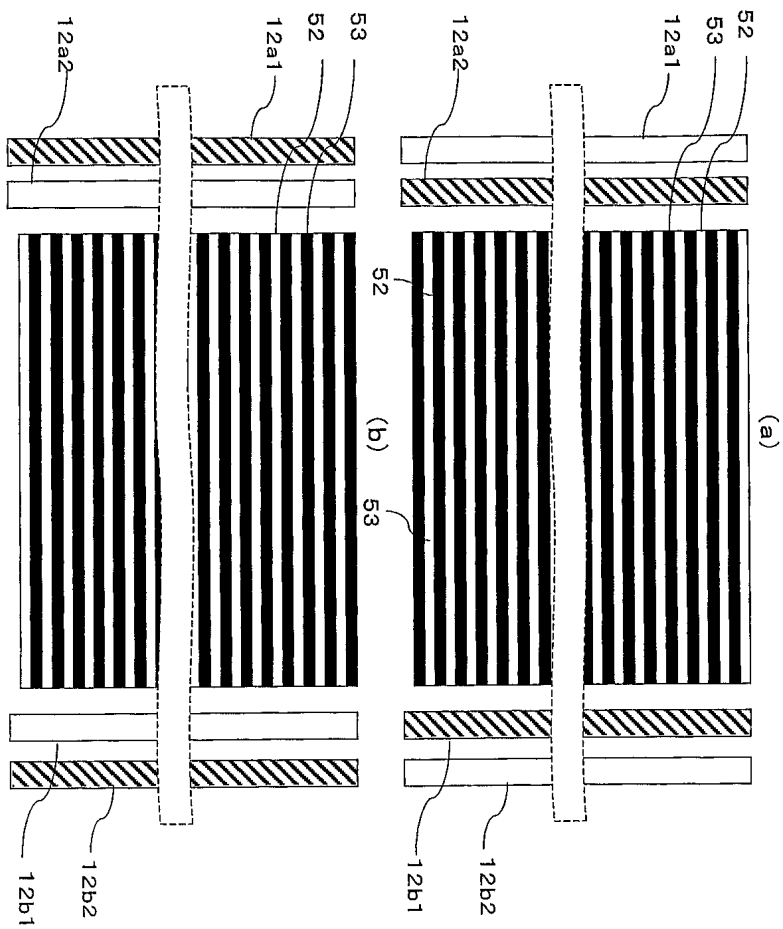
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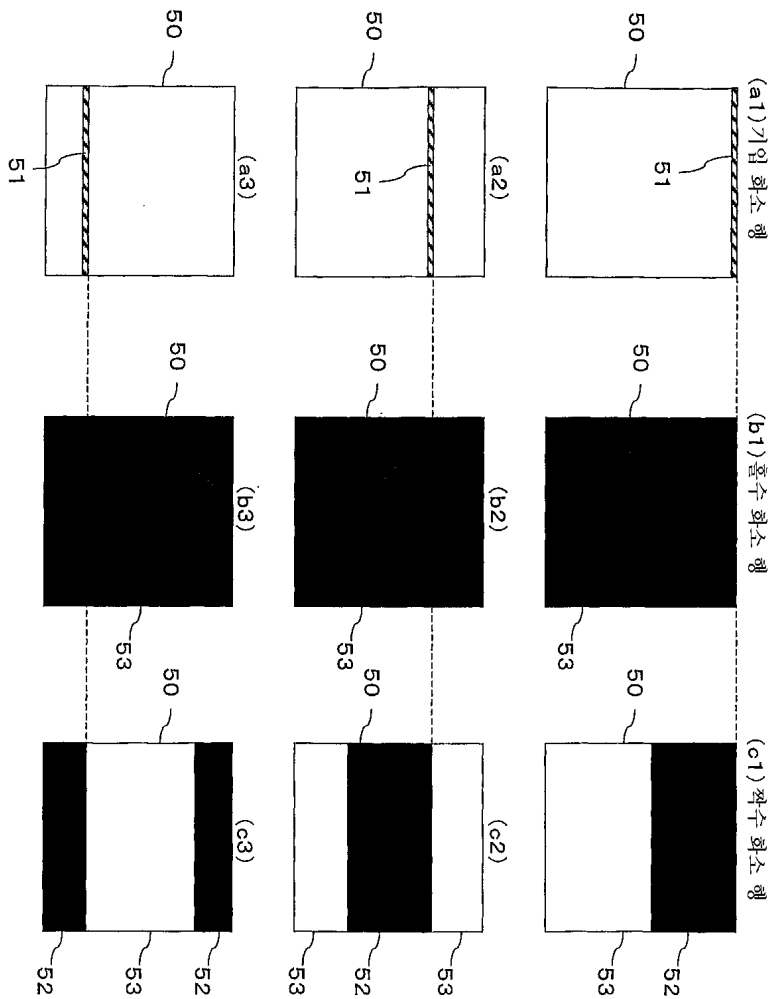


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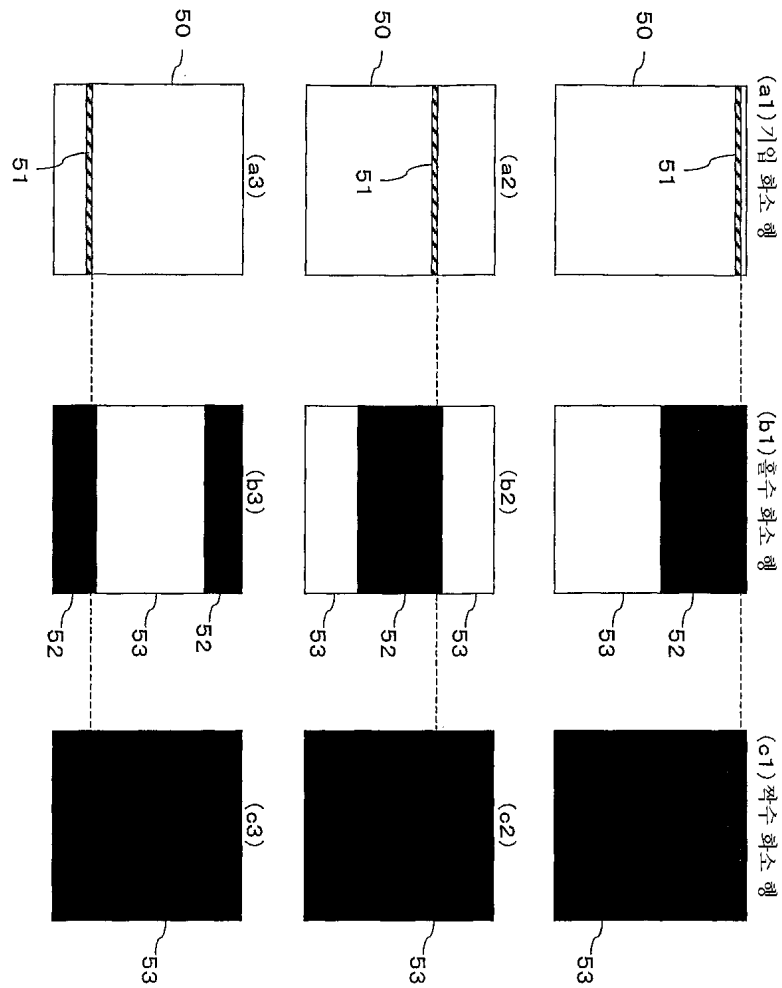




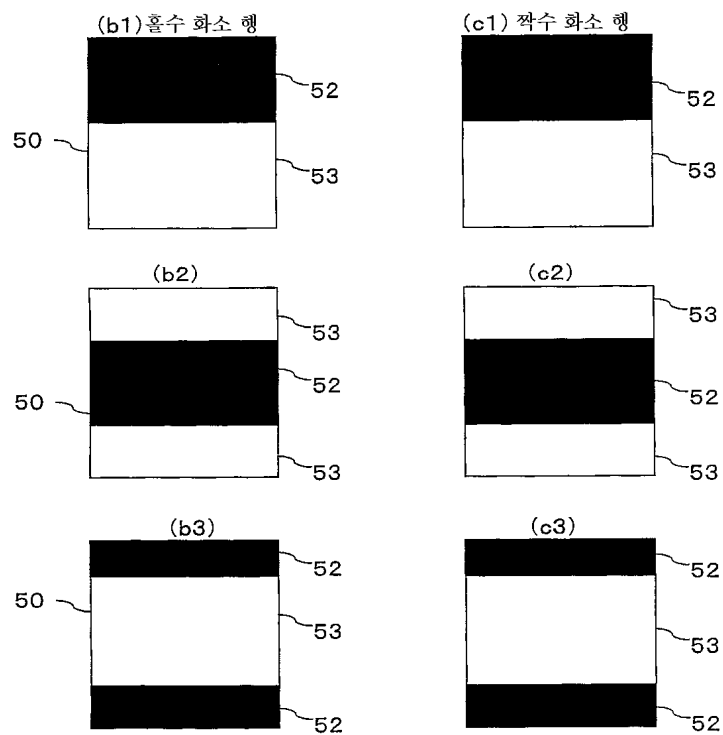
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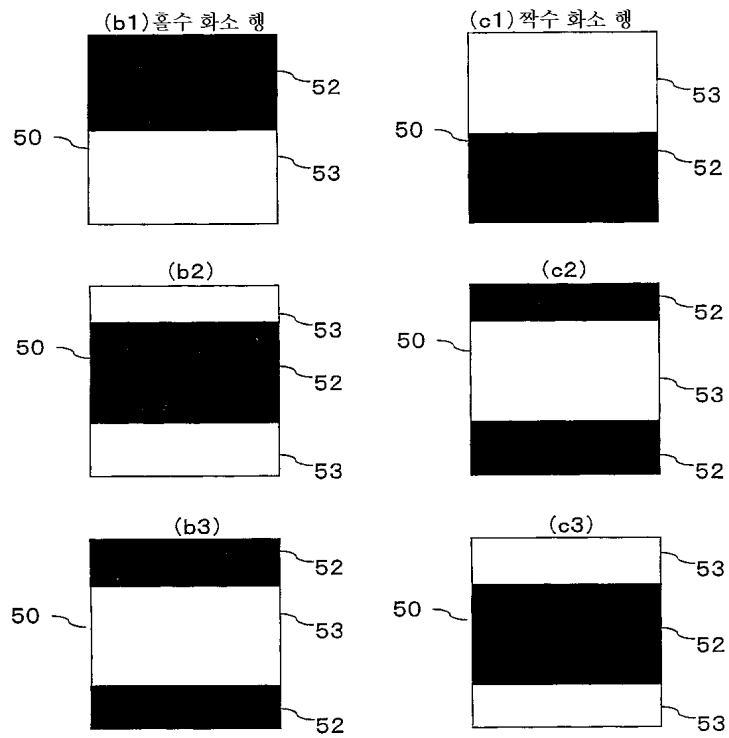
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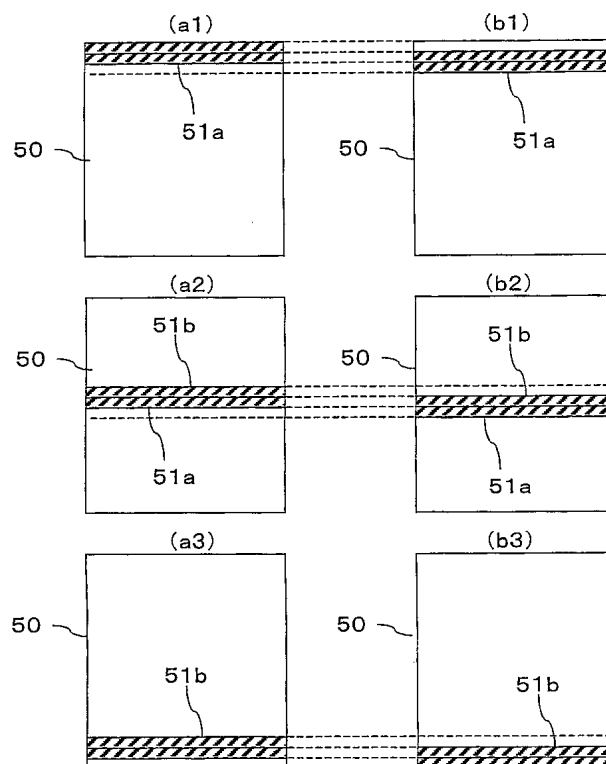
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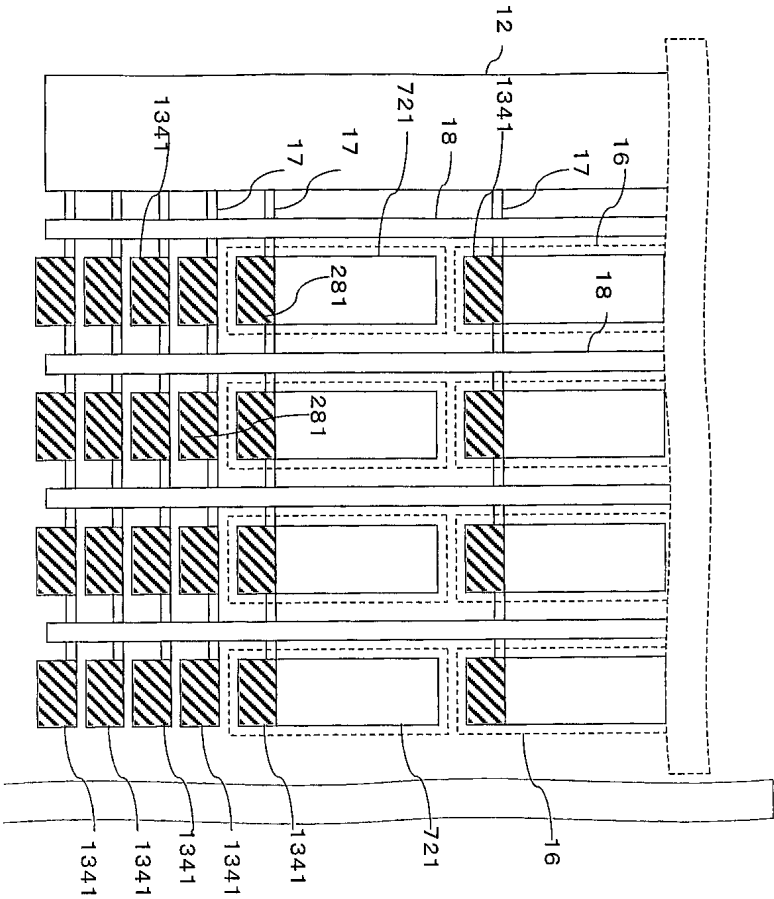
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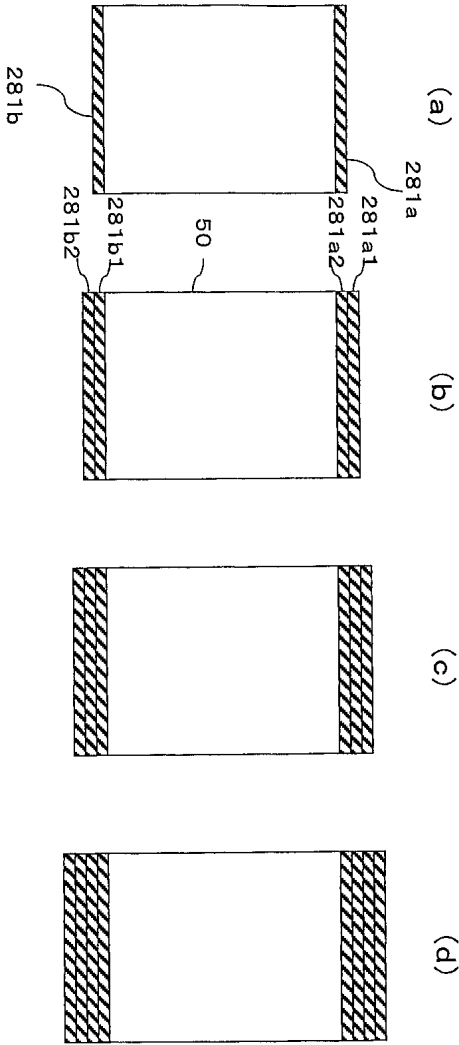
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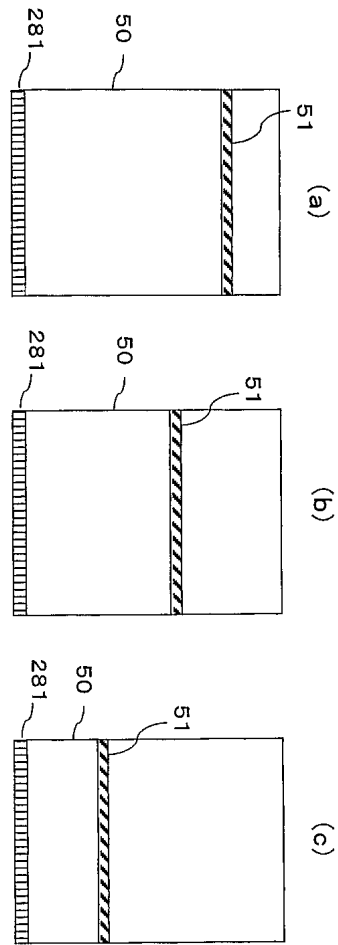
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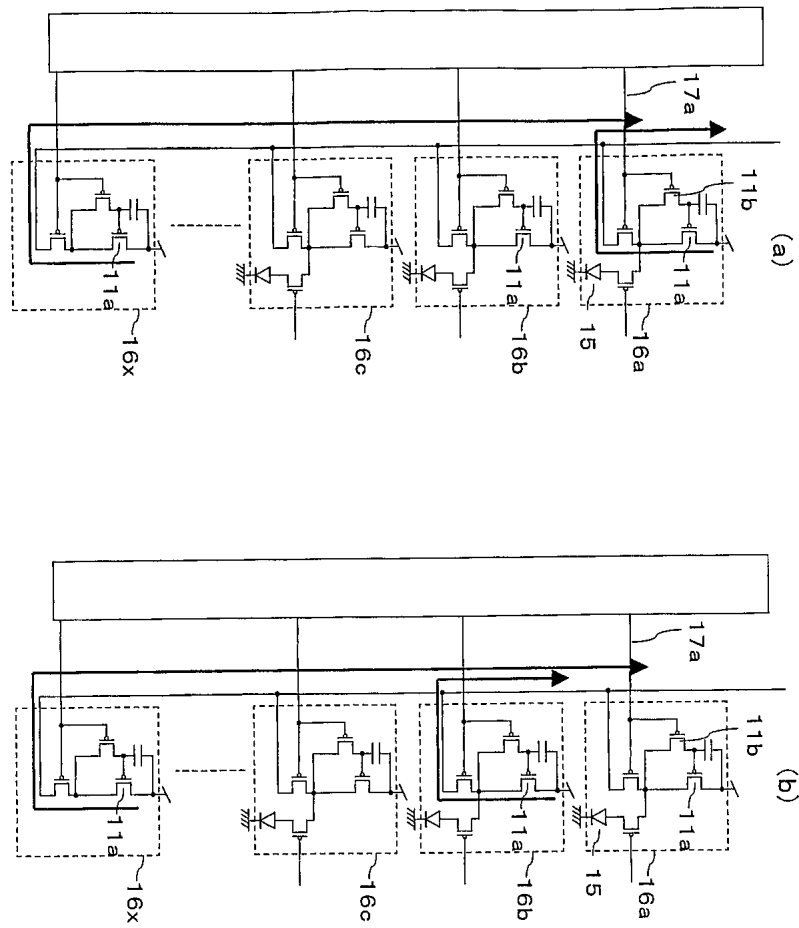
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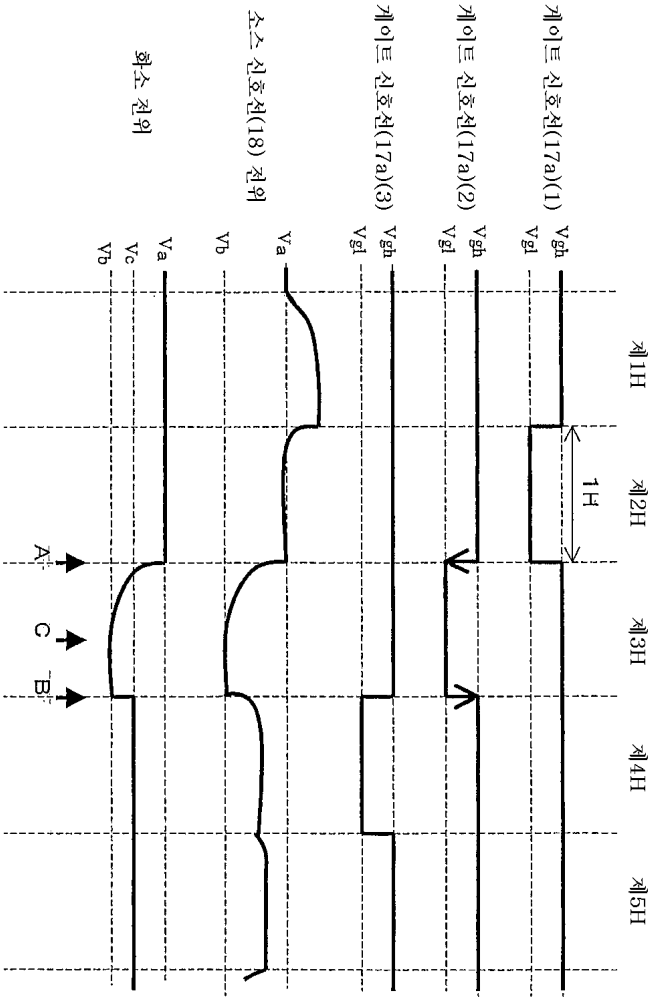
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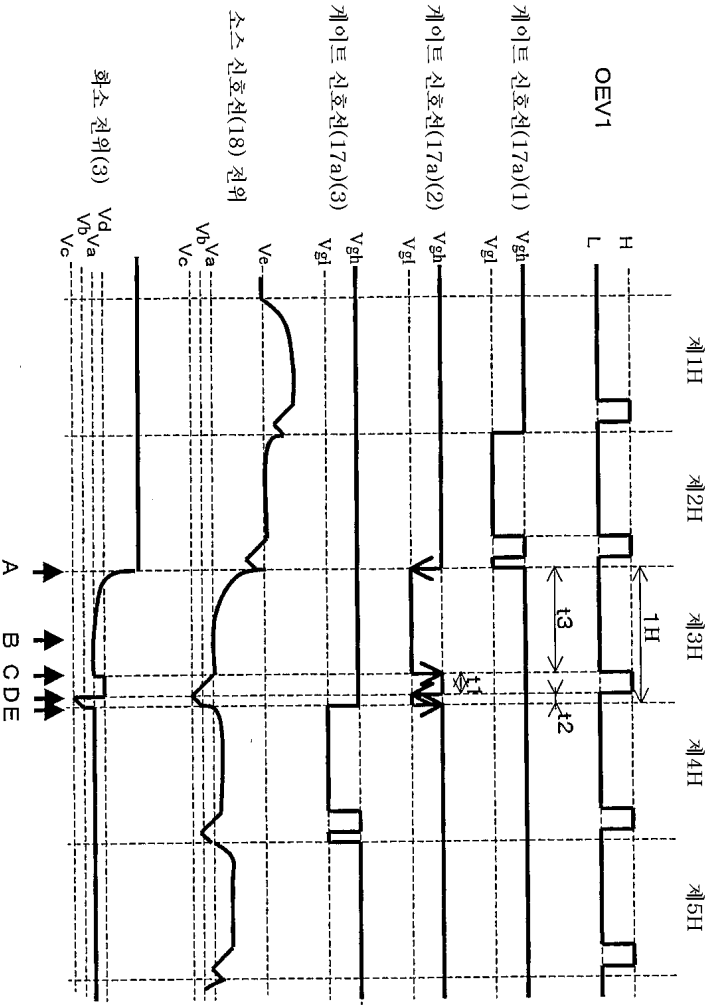
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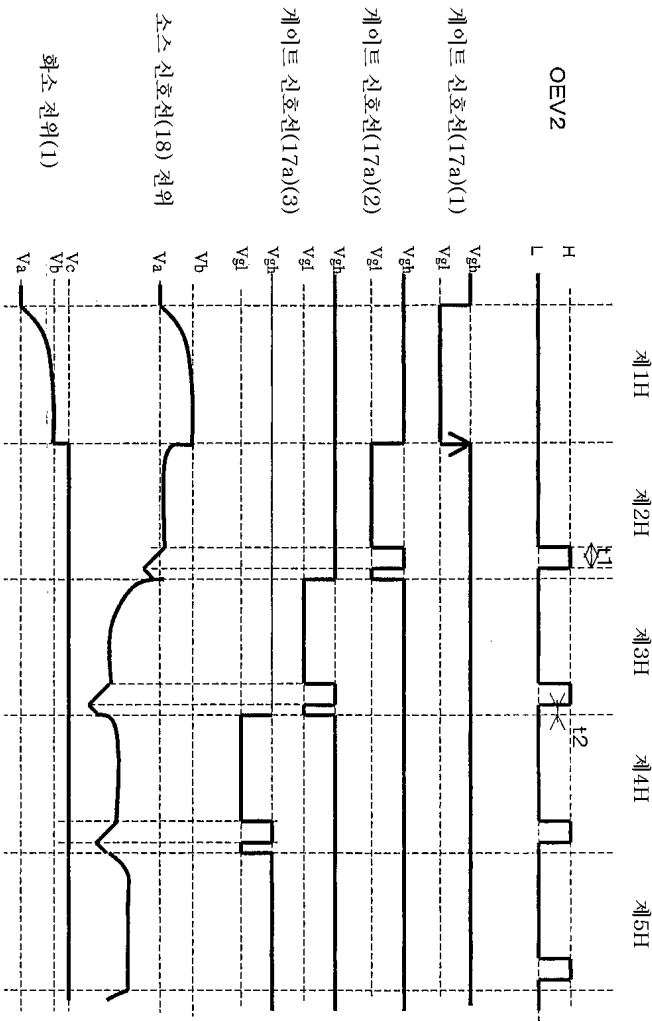
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139

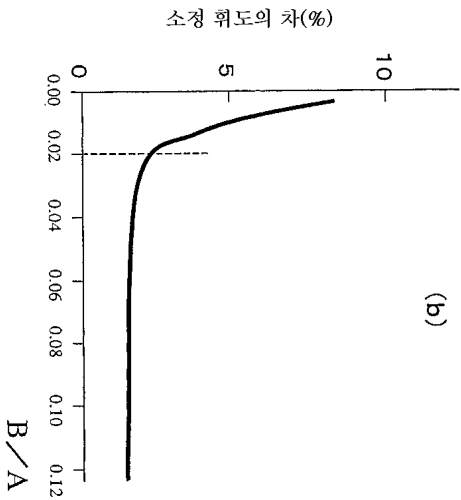
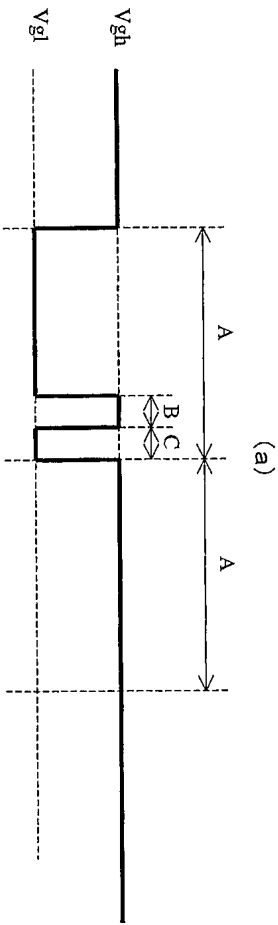


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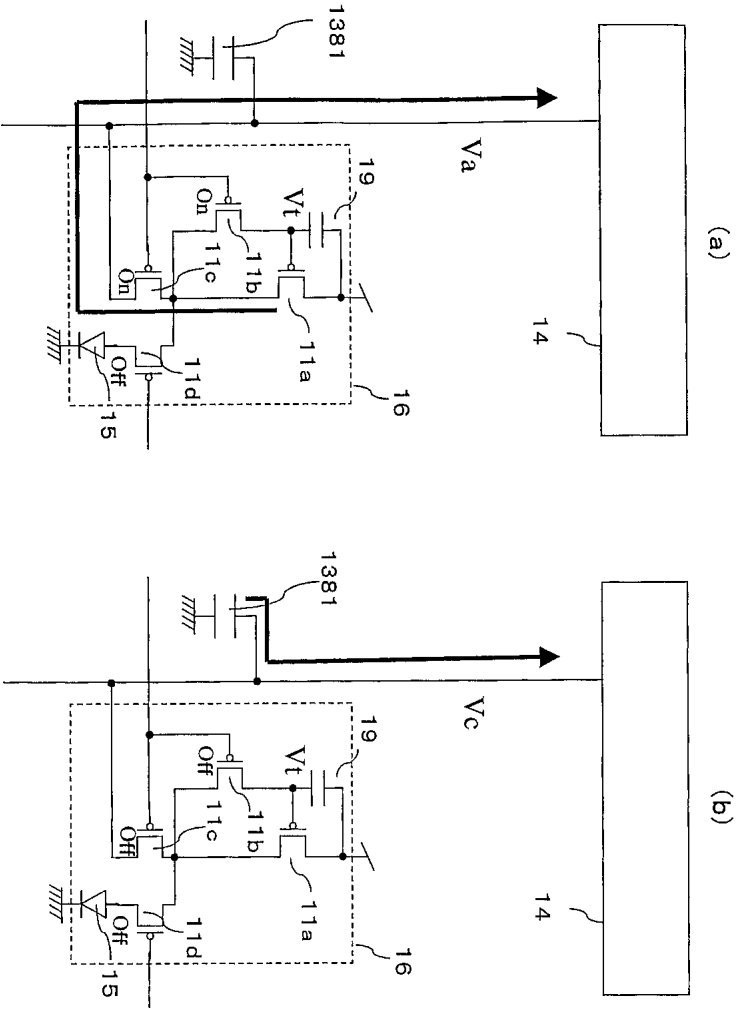


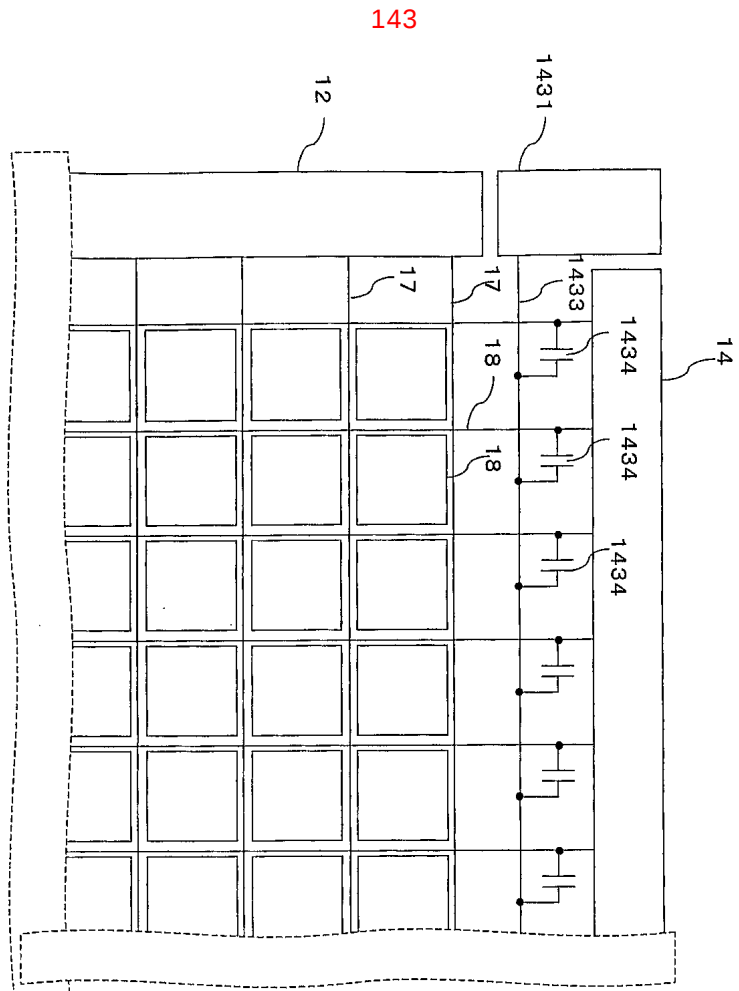
141

$B=t_1$
 $A=1H$
 $C=2\mu sec$

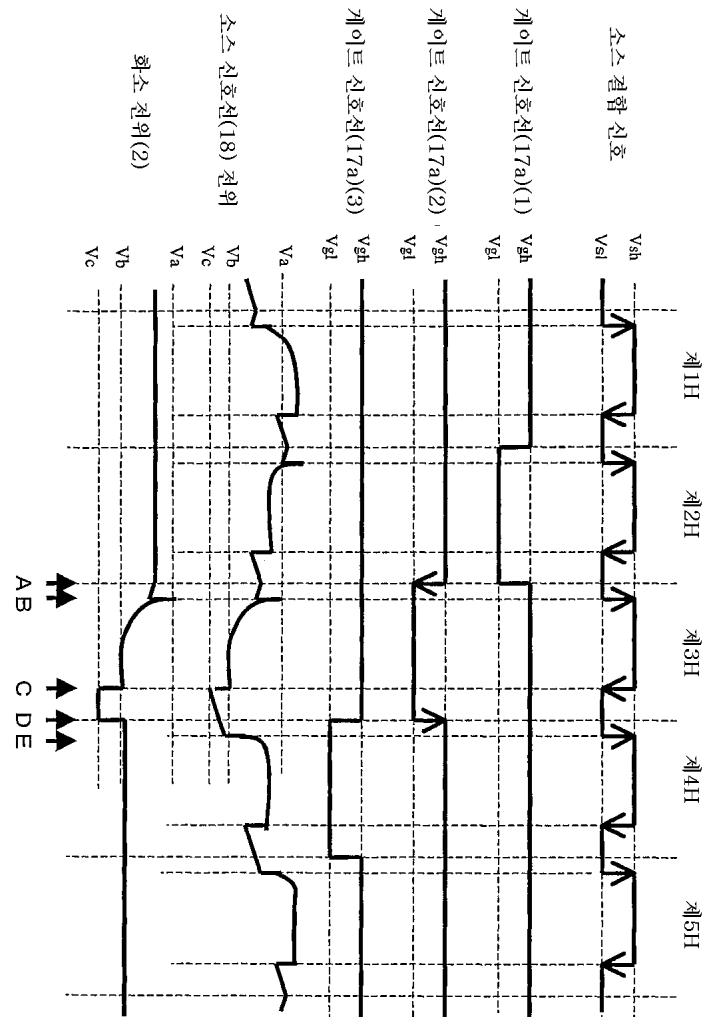


142





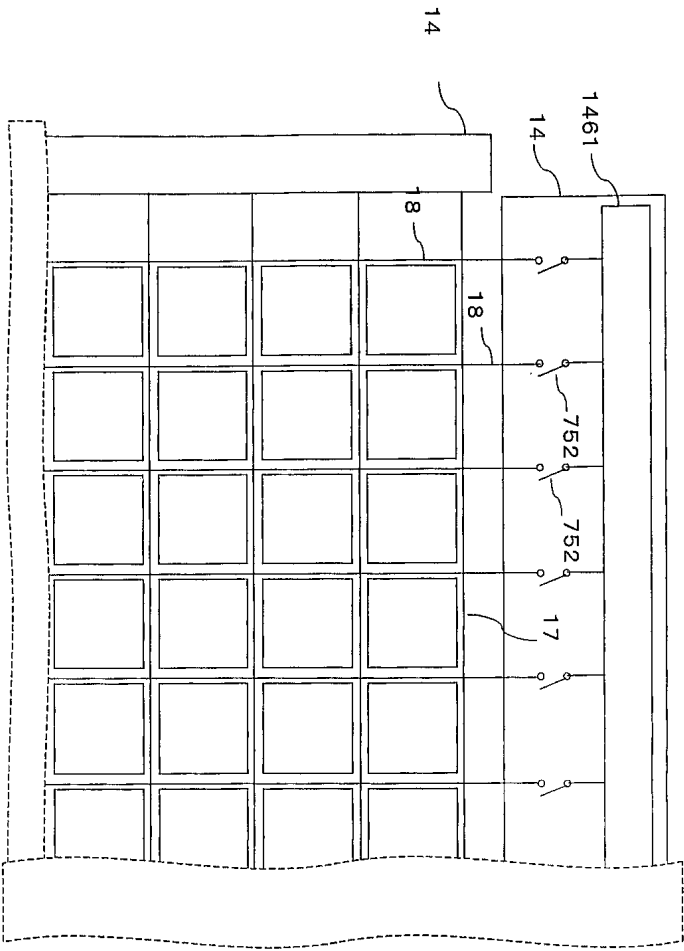
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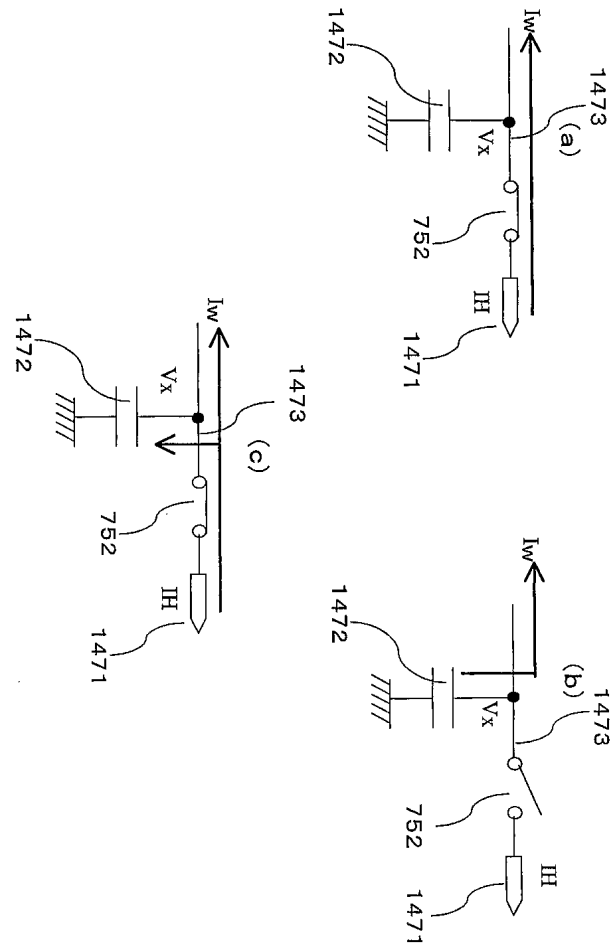
145

(평균) 계조	B/A (온 기간)			
	모드 1	모드 2	모드 3	모드 4
1	0	0	0.05	0
2	0	0	0.05	0
3	0	0	0.05	0
4	0	0	0.05	0
5	0	0	0.05	0
17	0	0.05	0.05	0.05H
18	0	0.05	0.05	0.05H
19	0	0.05	0.05	0.04H
20	0	0.05	0.05	0.04H
21	0	0.05	0.05	0.03H
22	0	0.05	0.05	0.03H
61	0	0.05	0.05	0.22H
62	0	0.05	0.05	0.23H
63	0	0.05	0.05	0.24H
64	0	0.05	0.05	0.25H

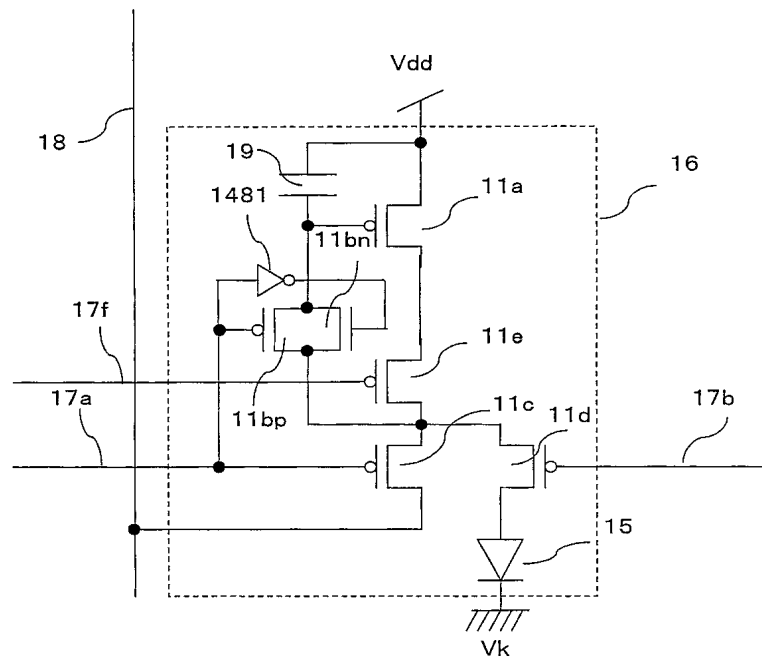
146



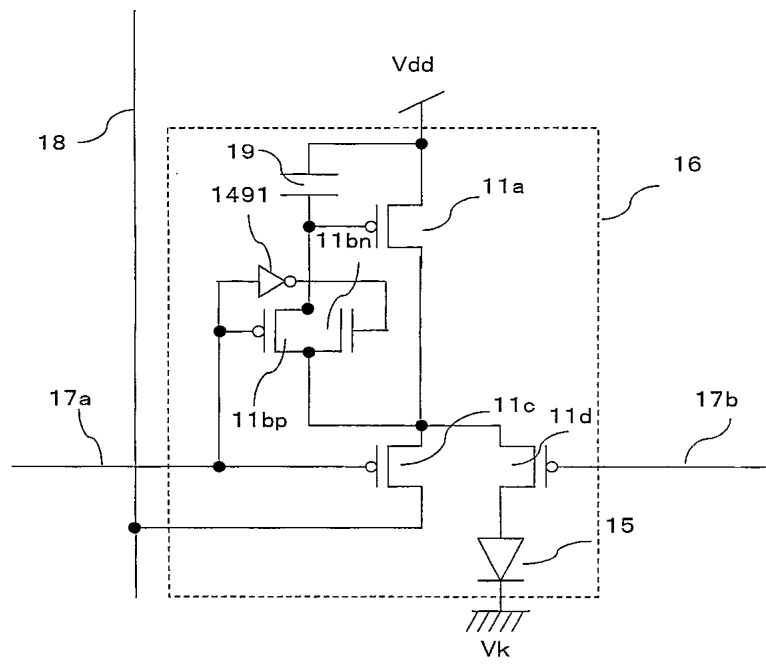
147



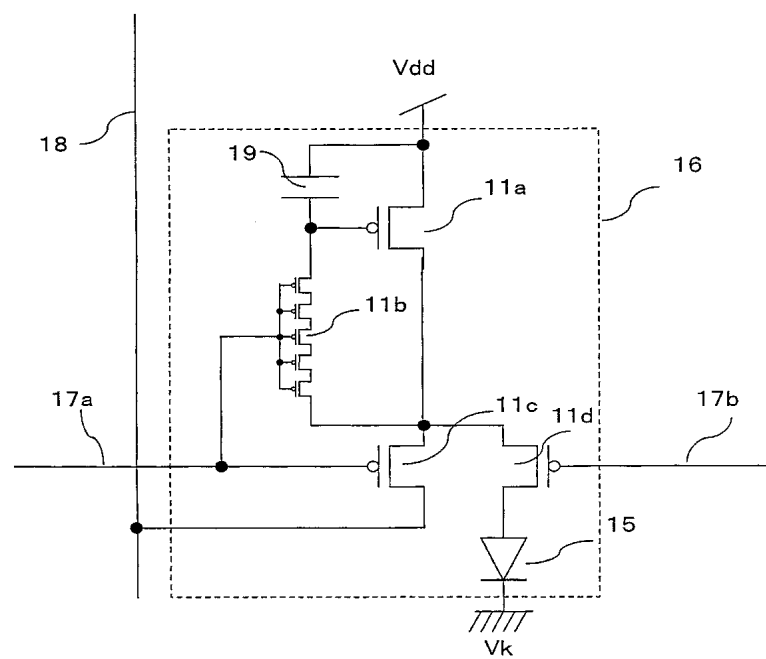
148

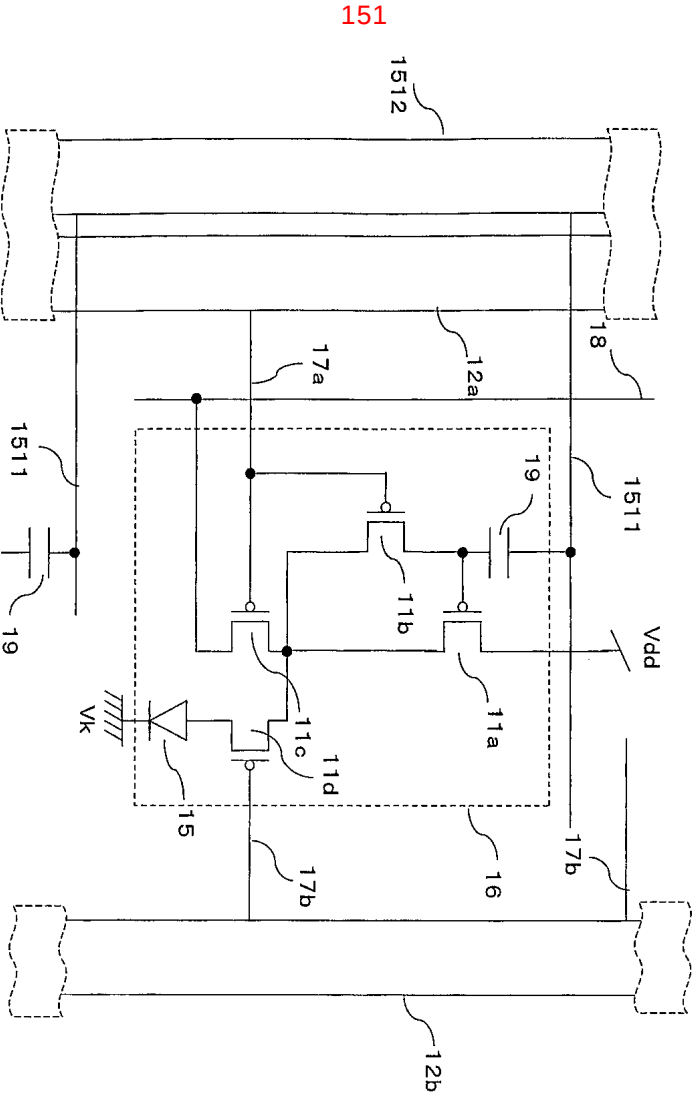


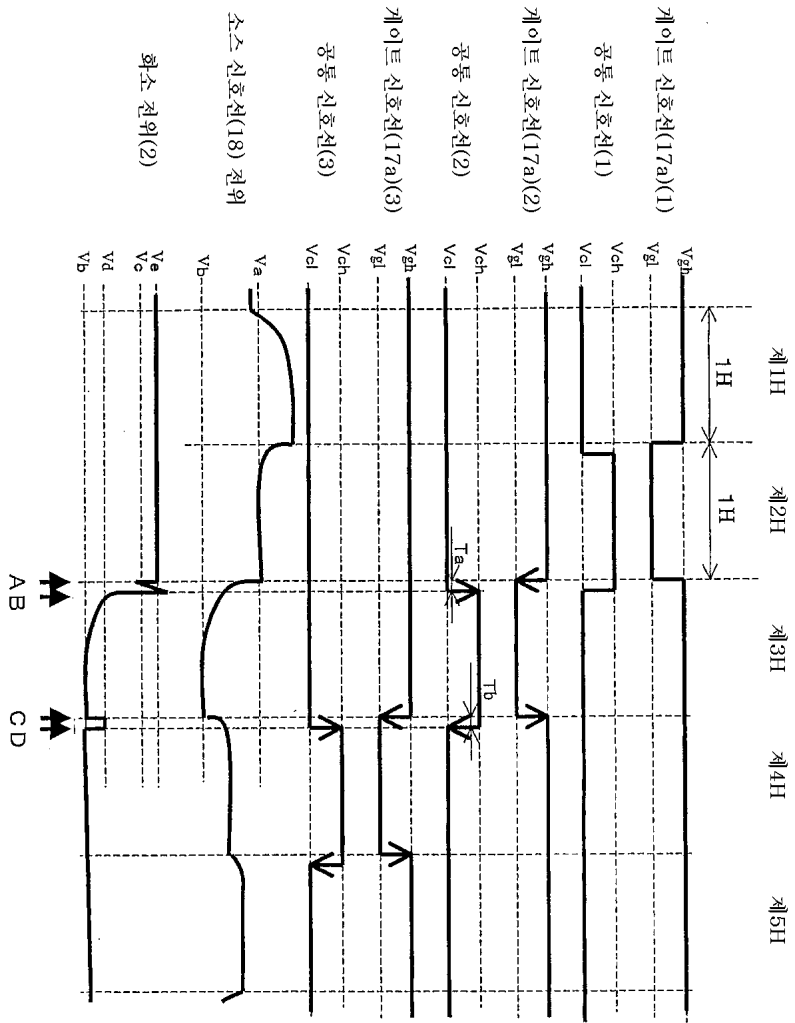
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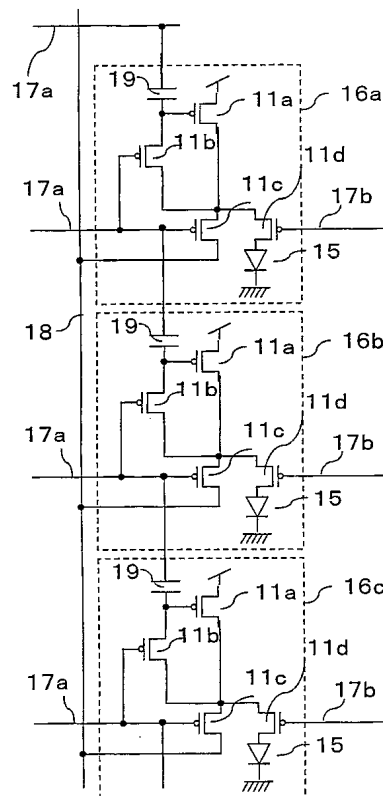
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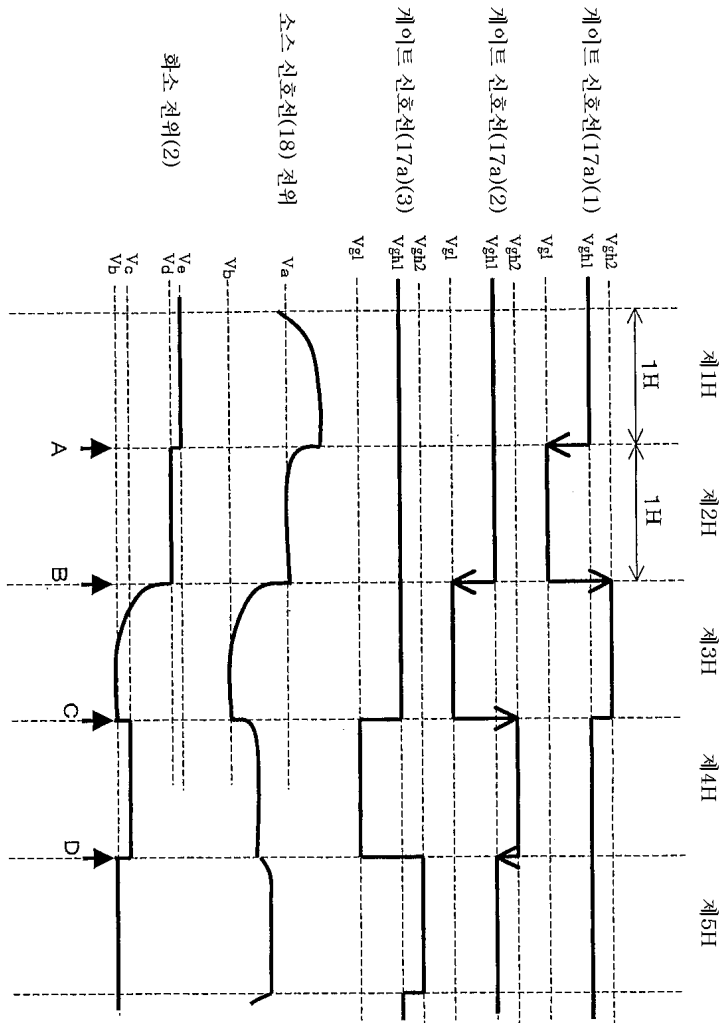


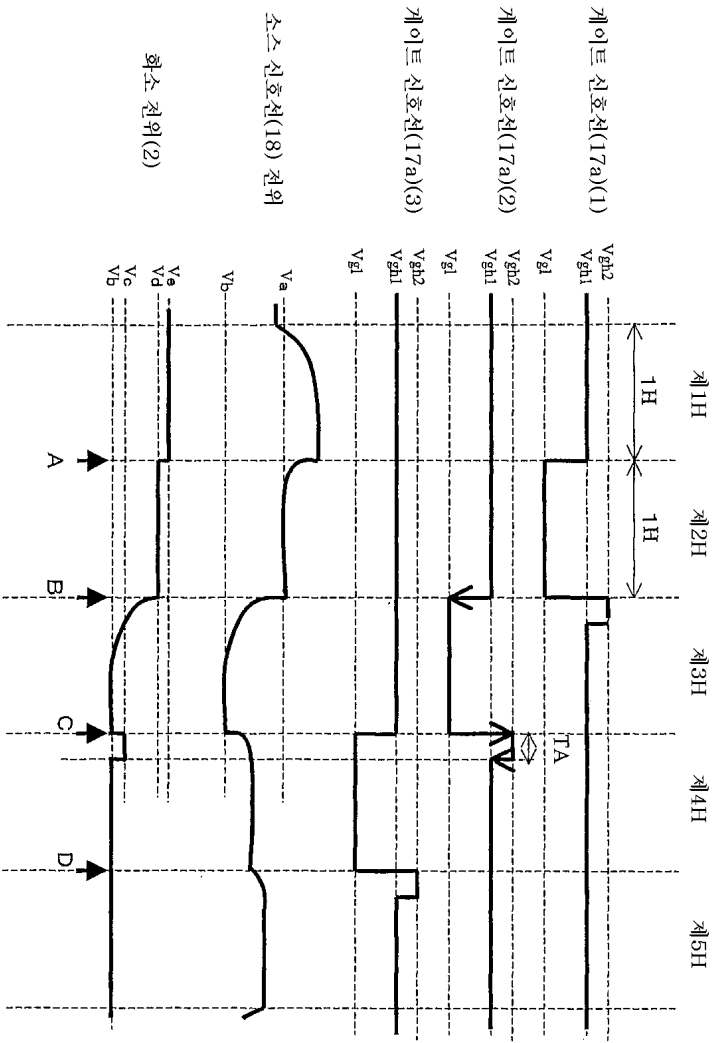




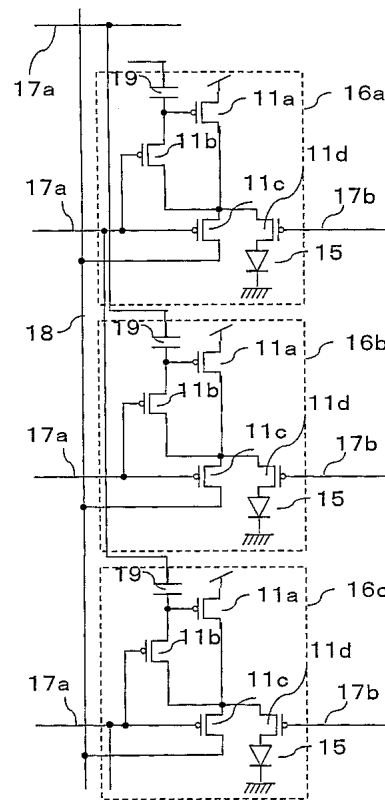
153

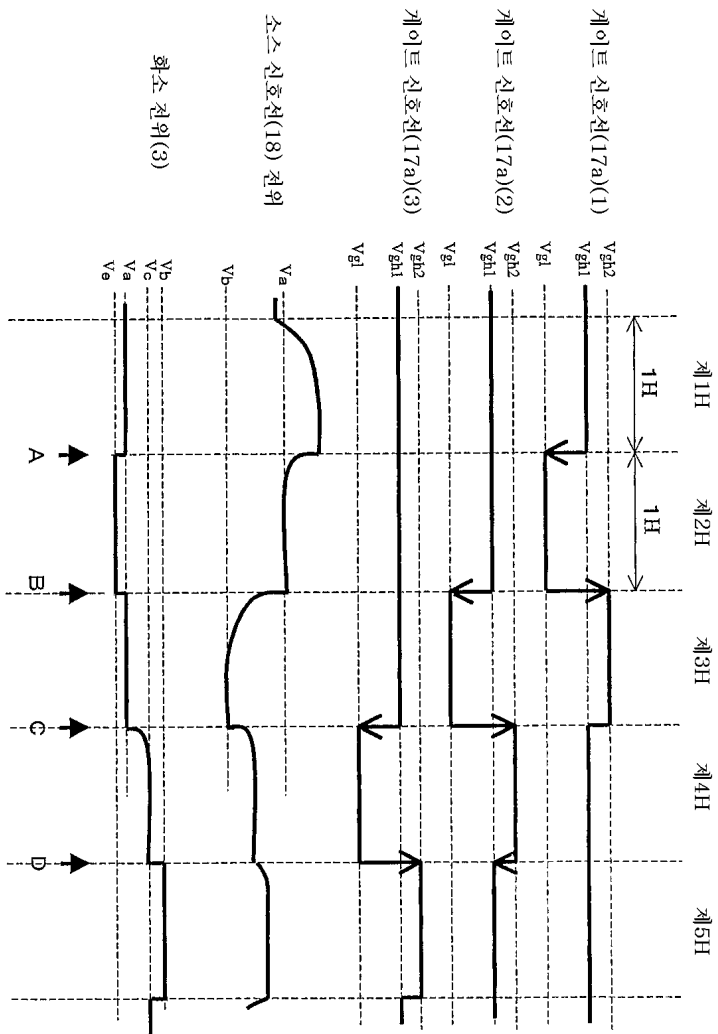




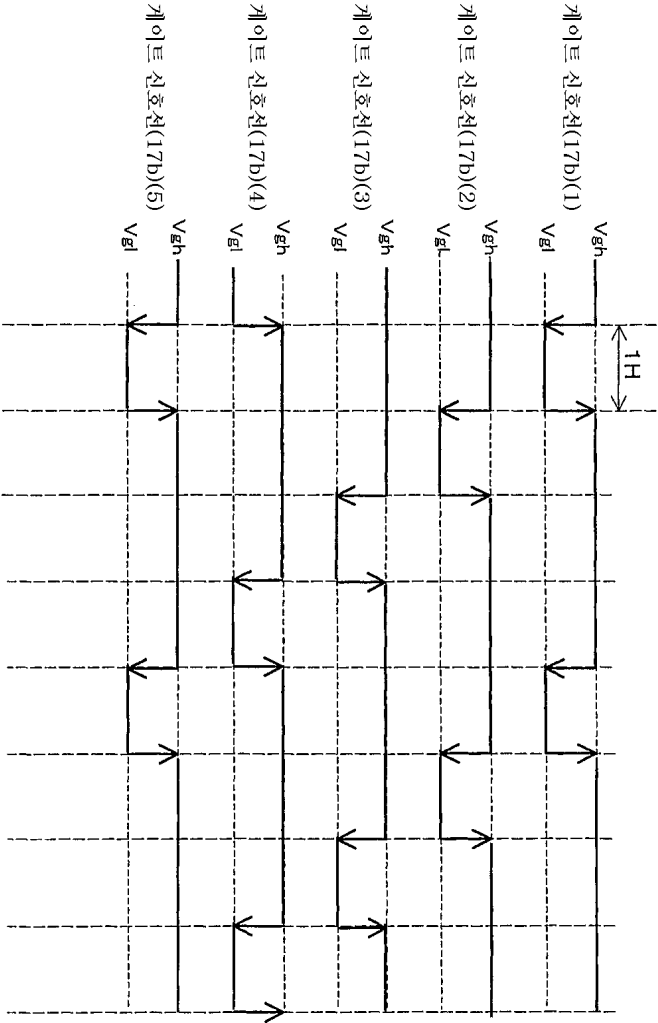


156

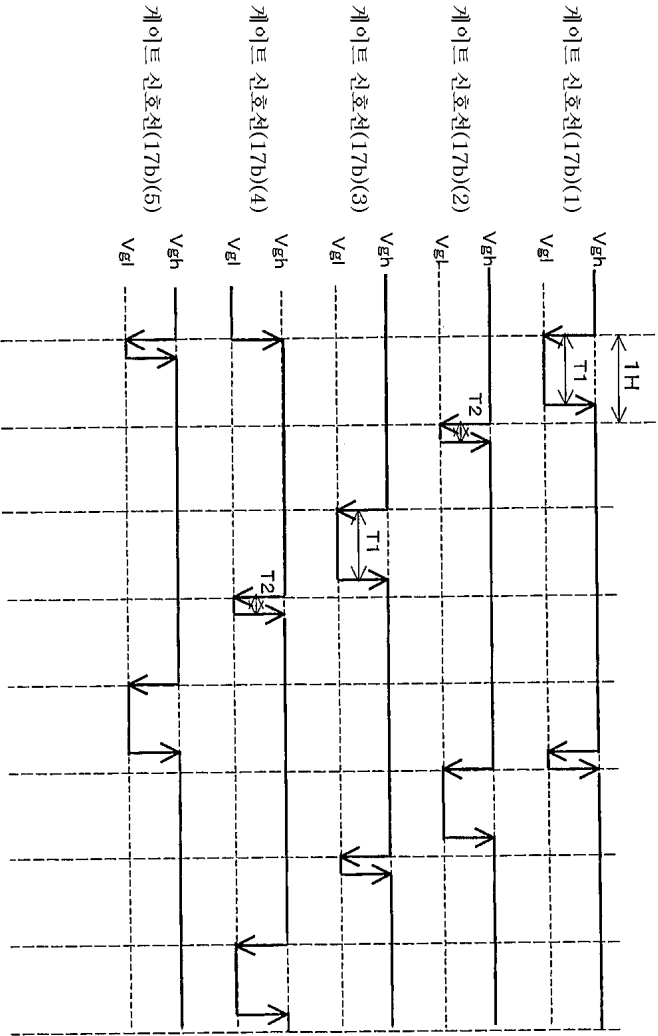




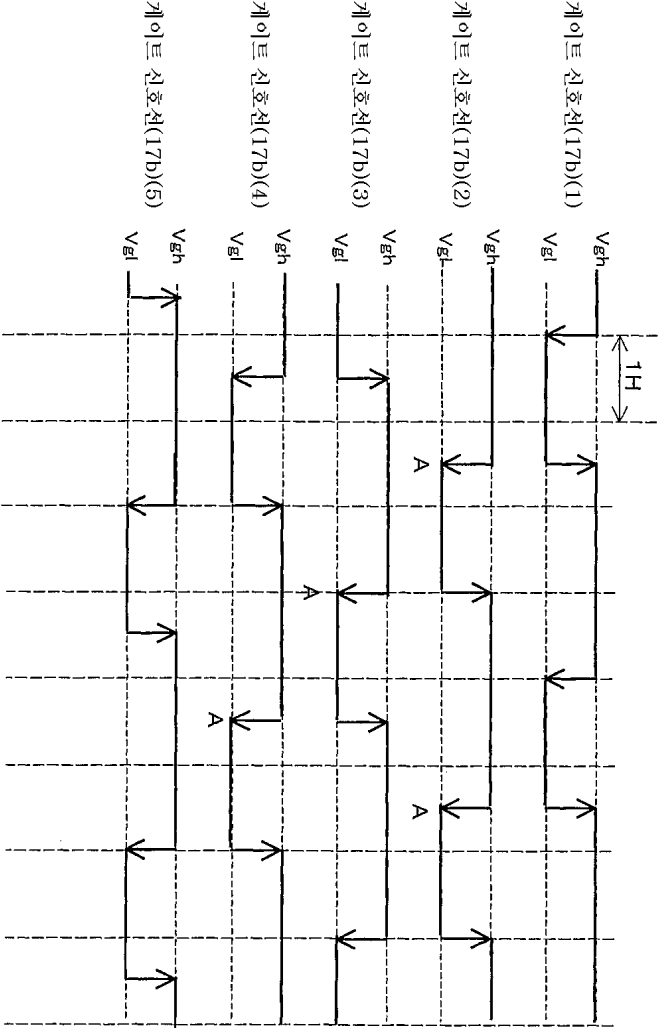
158



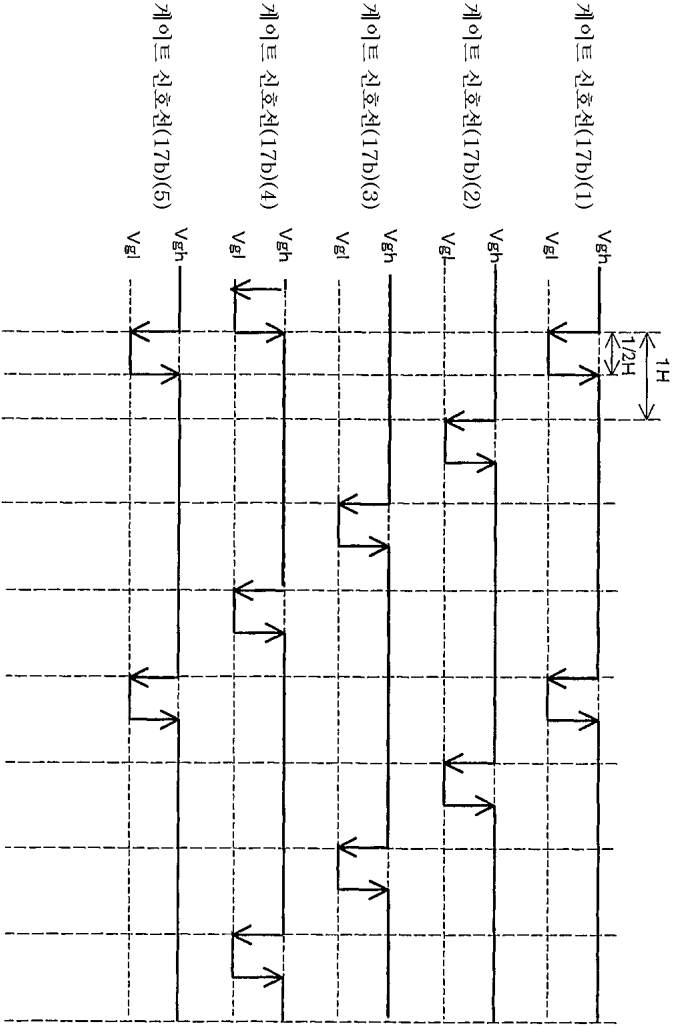
159



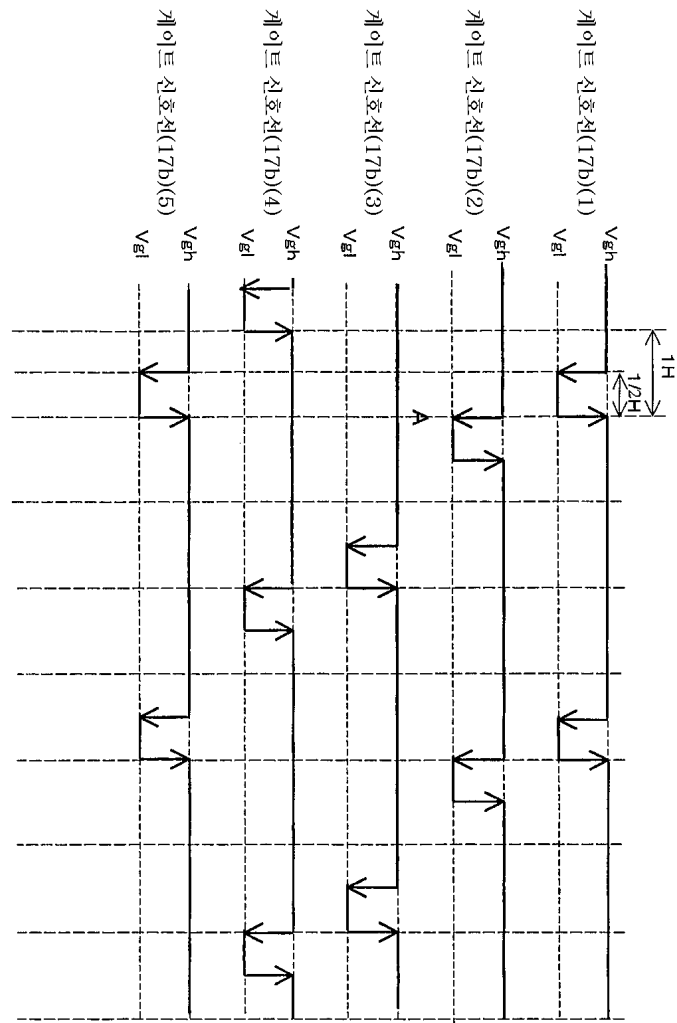
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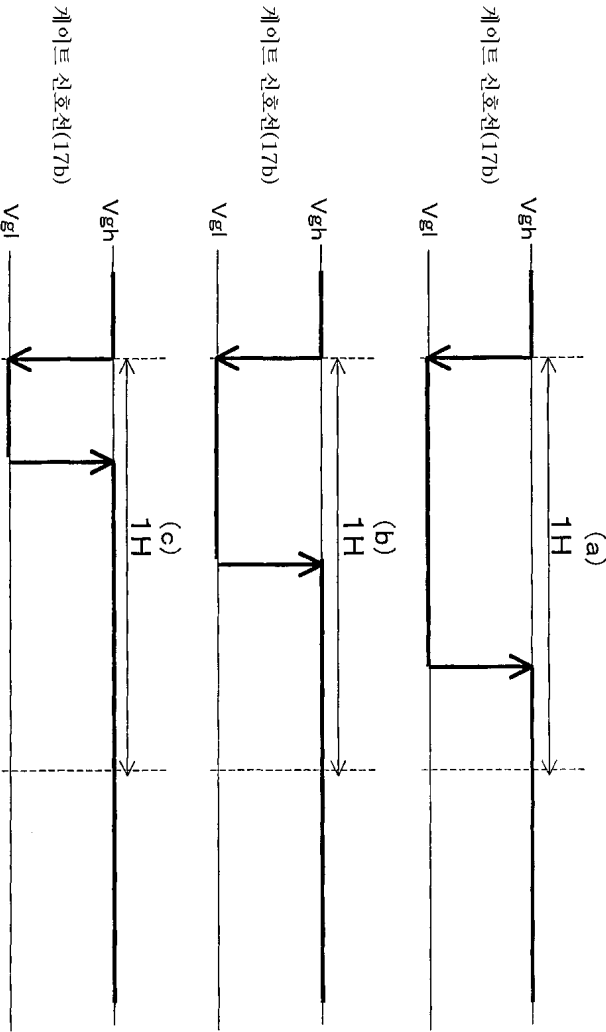


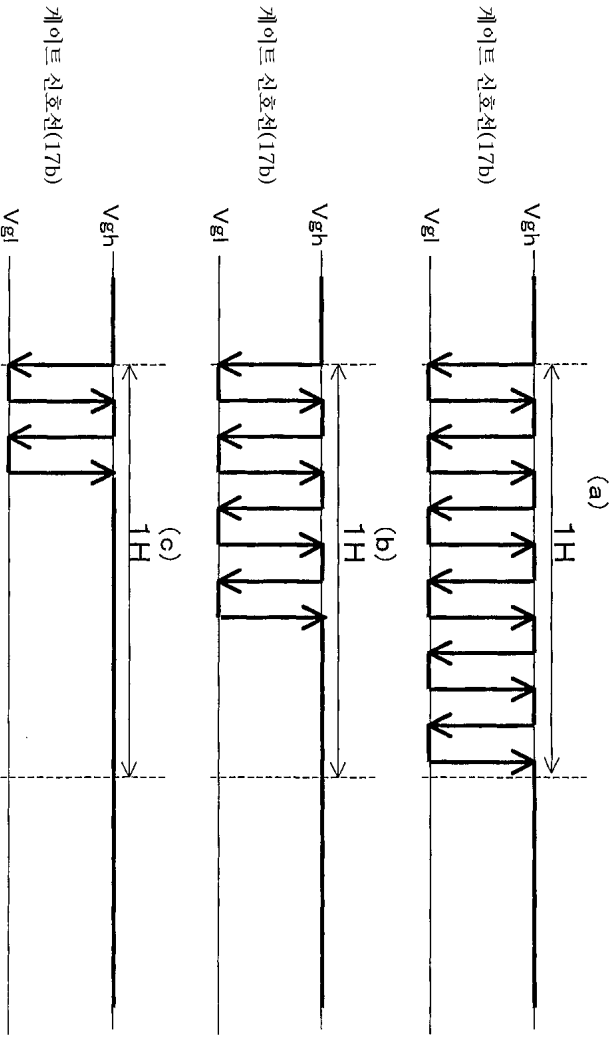
161



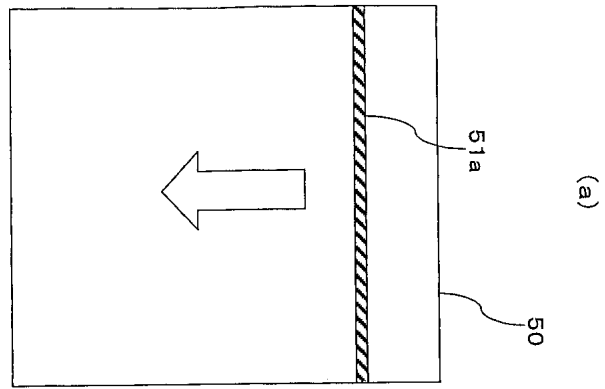
162



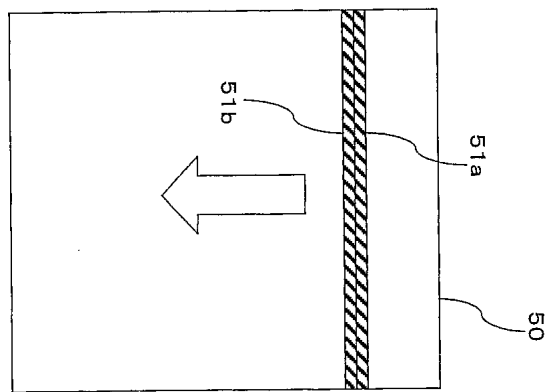




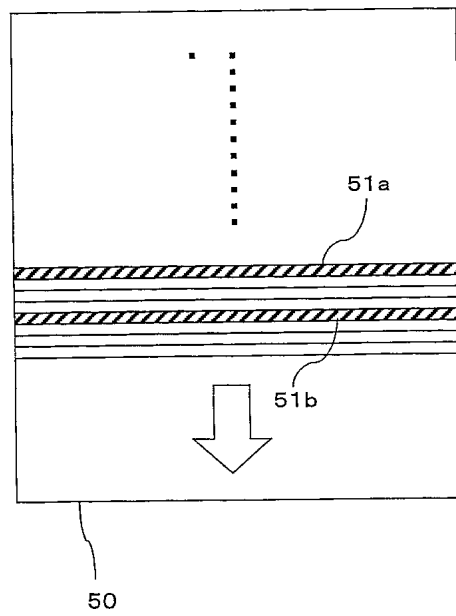
165



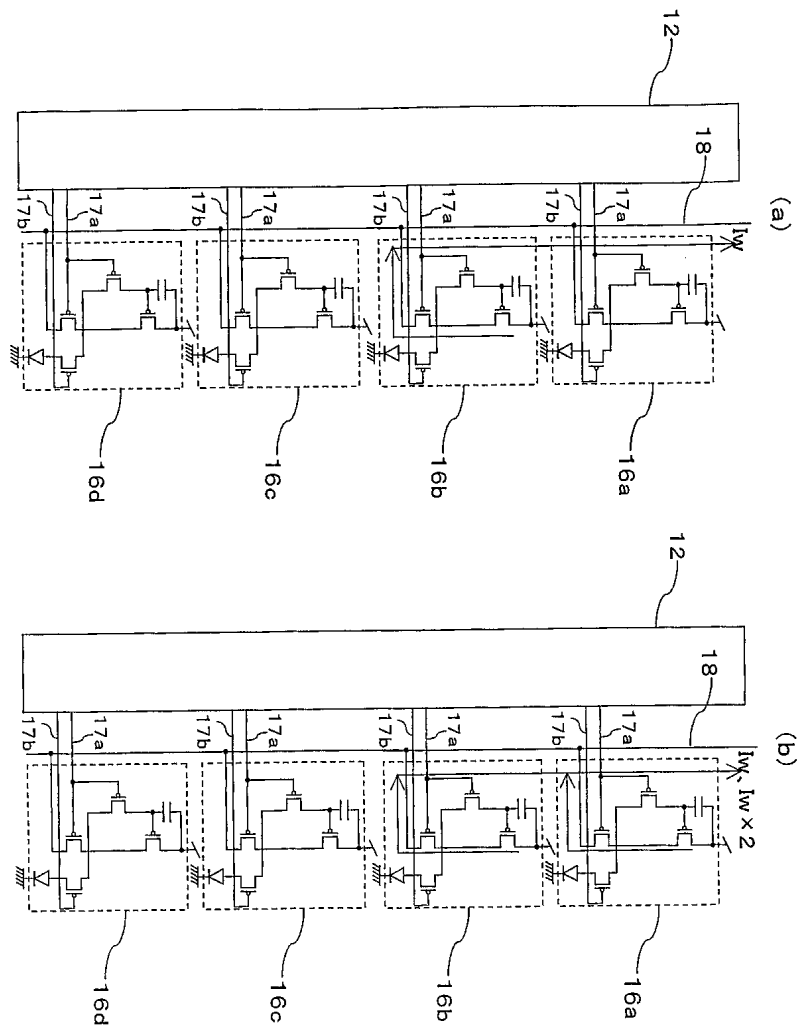
(b)



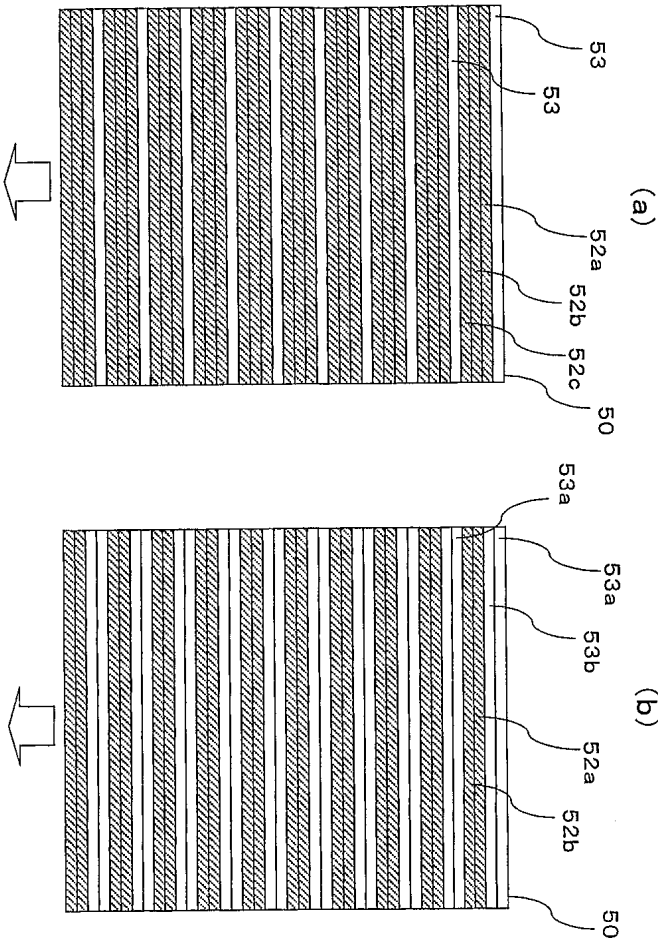
166



167



168

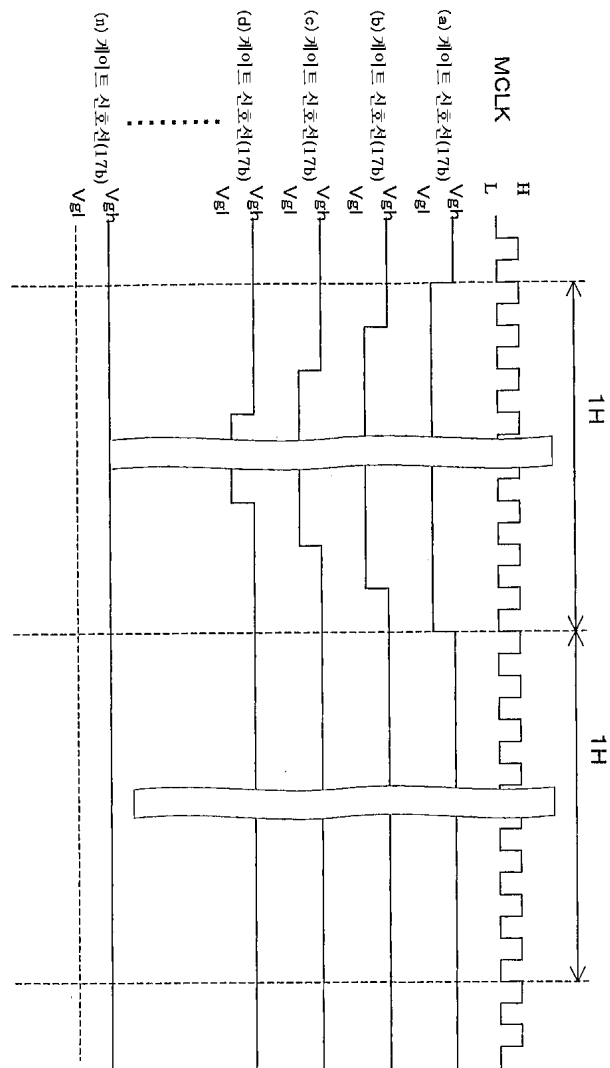


게이트 신호선(17b)(1)	V _{GH}	1H	2H	3H	4H	5H	6H	7H	8H	9H	10H	11H	12H	L-9H-L-8H-L-7H-L-6H-L-5H-L-4H-L-3H-L-2H-L-1H	LH
게이트 신호선(17b)(2)	V _{GH}														
게이트 신호선(17b)(3)	V _{GH}														
게이트 신호선(17b)(4)	V _{GH}														
게이트 신호선(17b)(5)	V _{GH}														
게이트 신호선(17b)(6)	V _{GH}														
게이트 신호선(17b)(7)	V _{GH}														
게이트 신호선(17b)(8)	V _{GH}														
게이트 신호선(17b)(9)	V _{GH}														
게이트 신호선(17b)(10)	V _{GH}														
게이트 신호선(17b)(11)	V _{GH}														

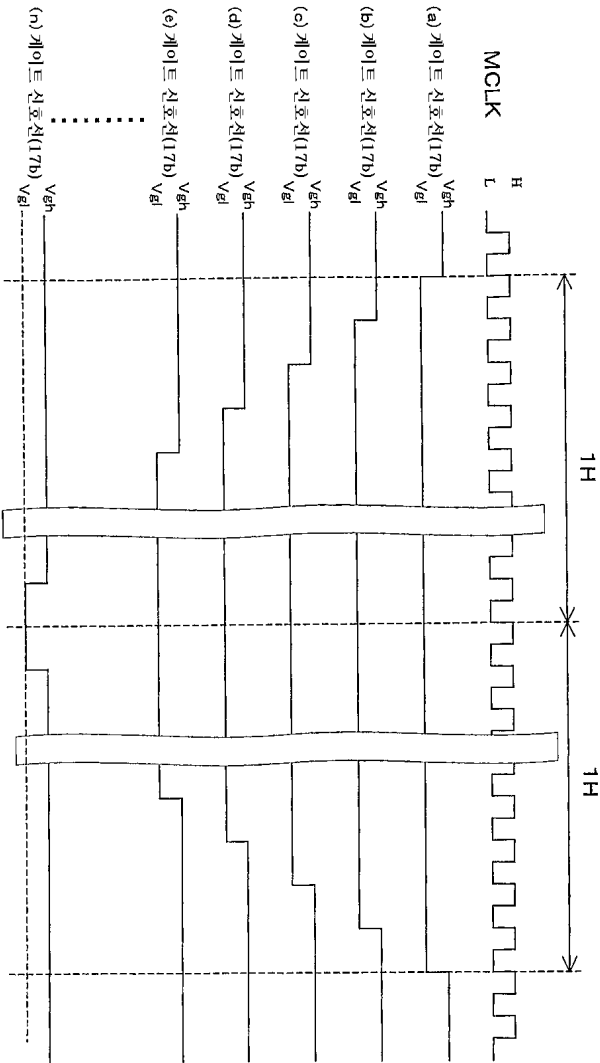
170

[illegible]

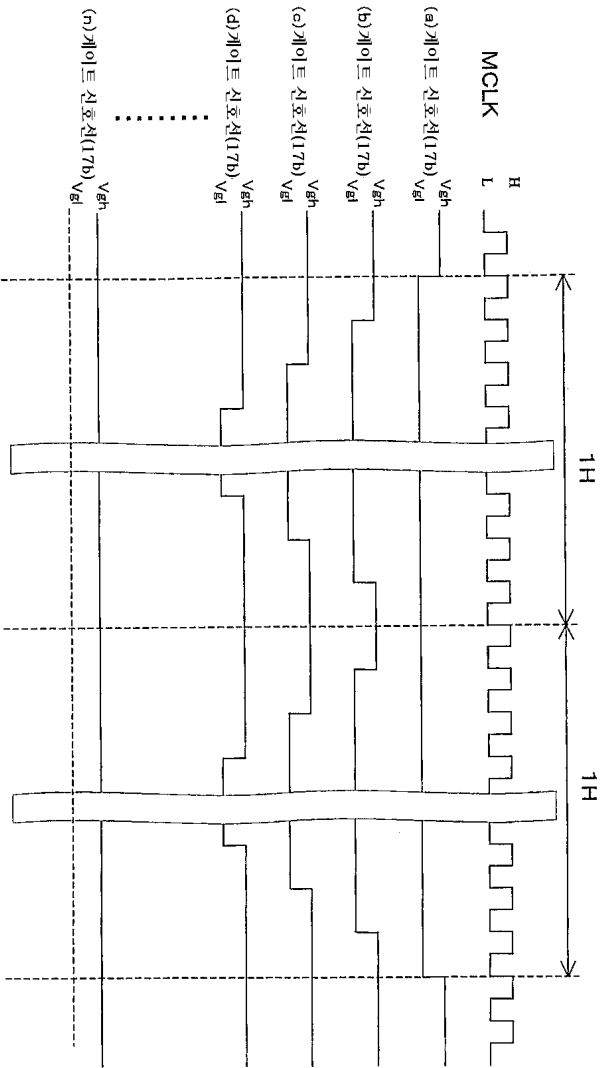
171



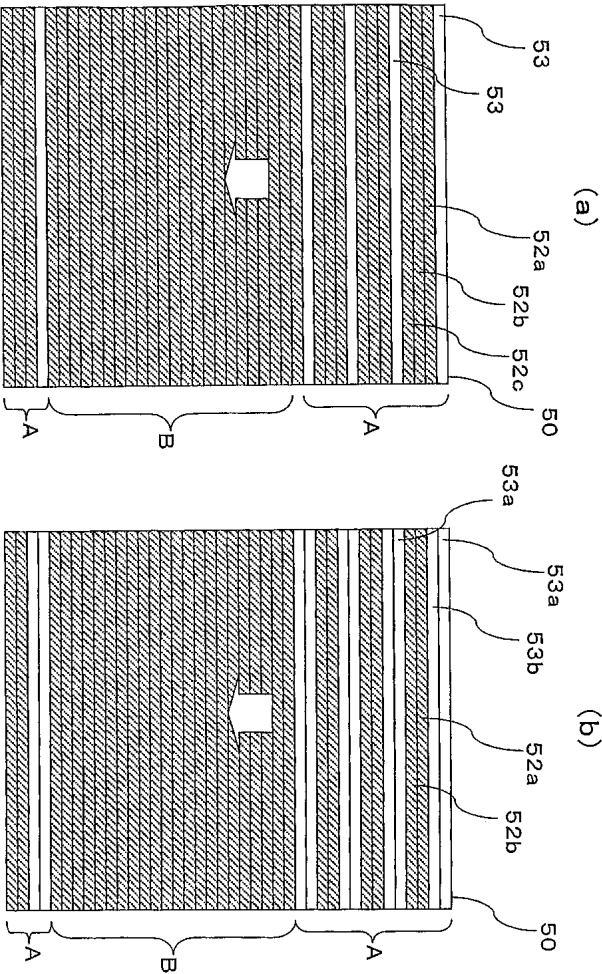
172

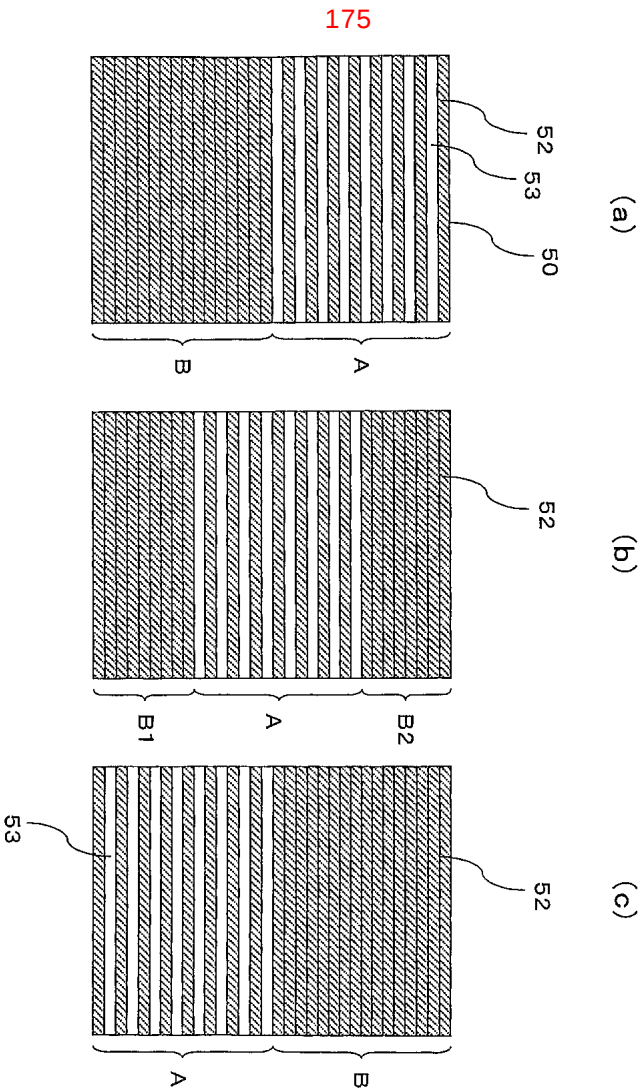


173

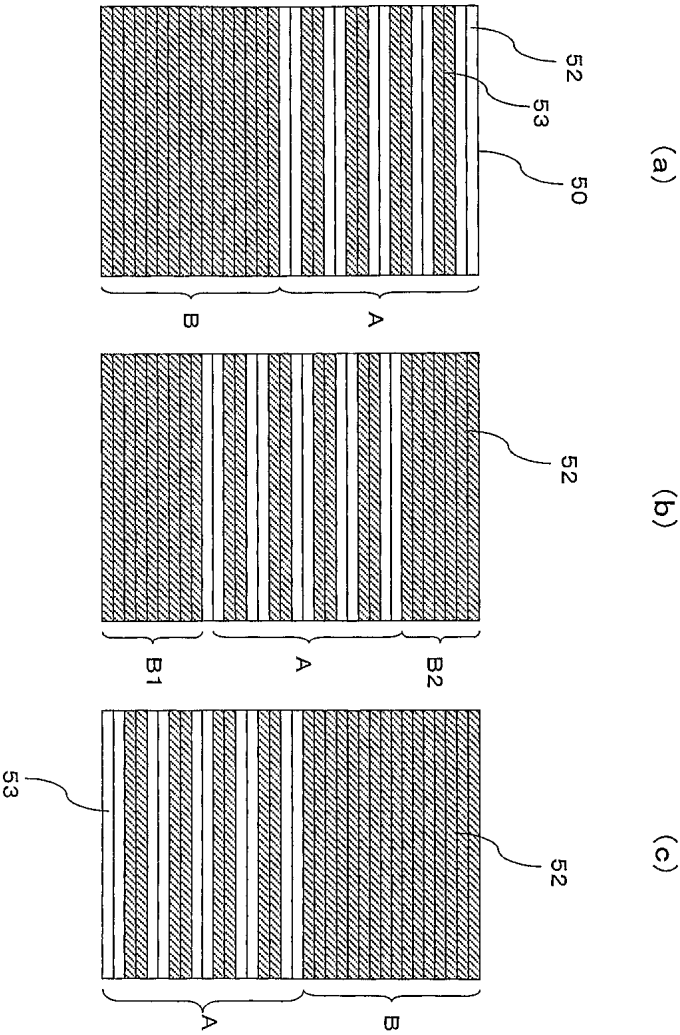


174

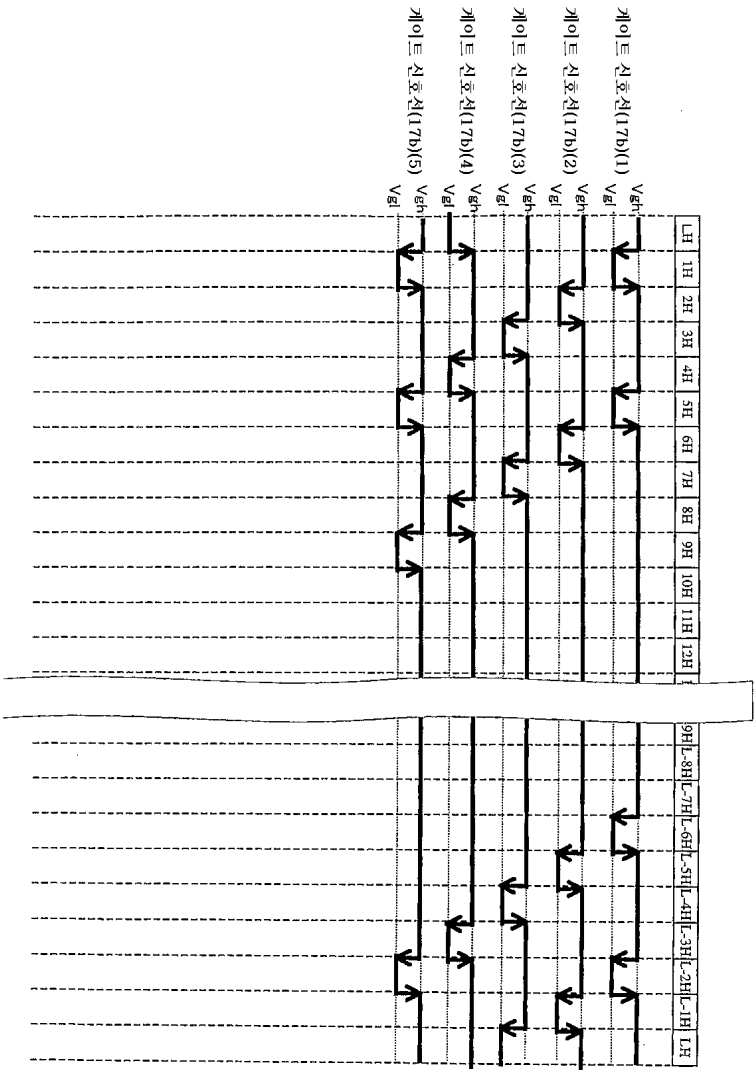




176



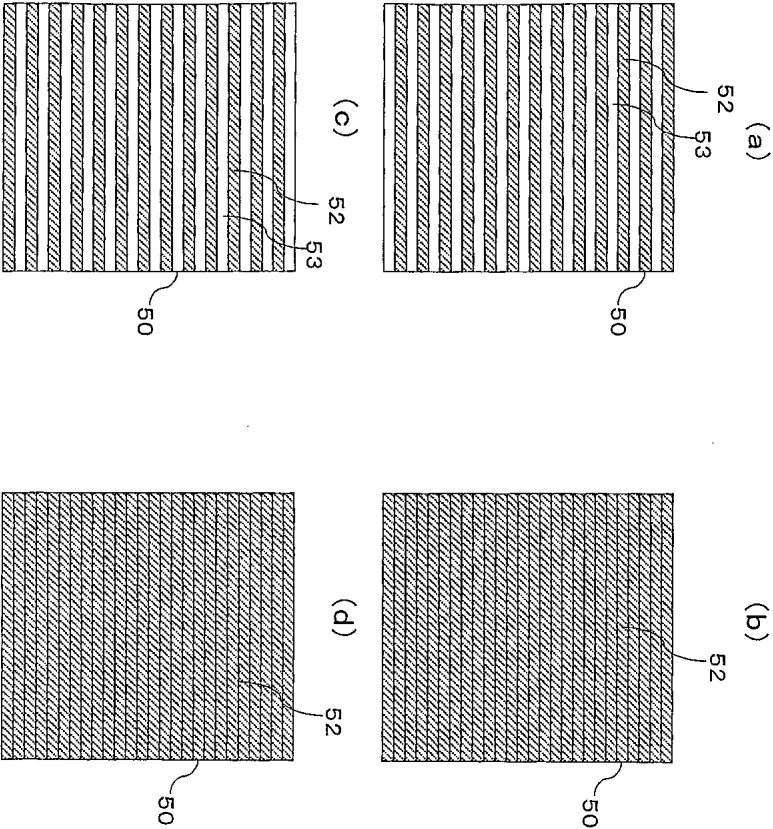
177

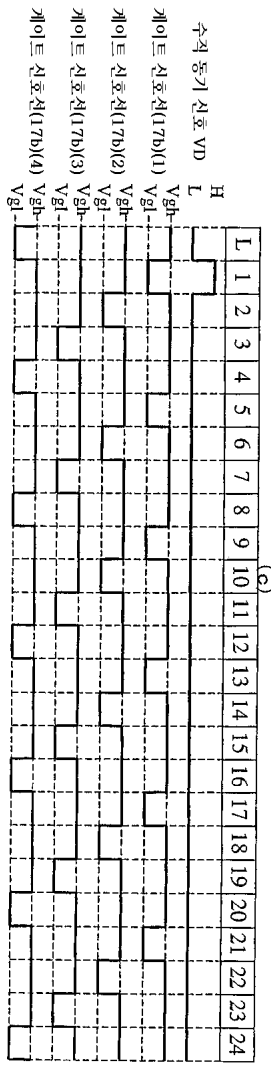
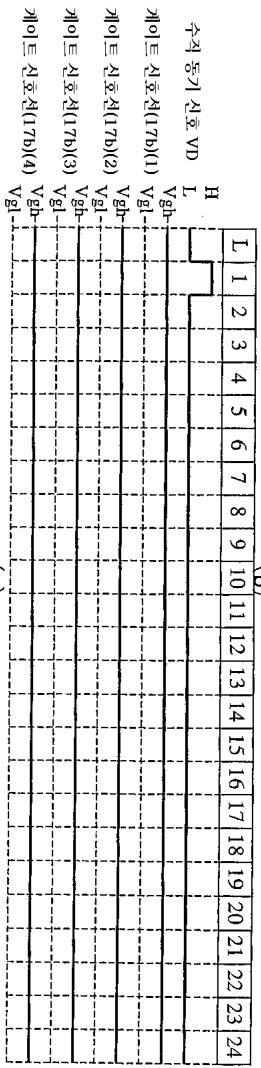
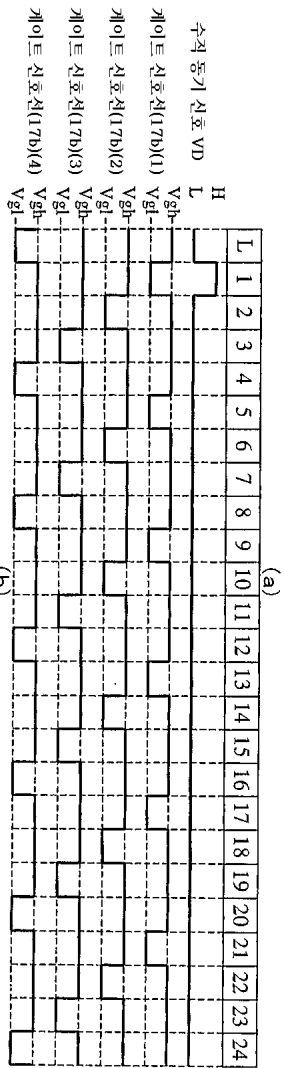


178

1H	2H	3H	4H	5H	6H	7H	8H	9H	10H	11H	12H
게이트 신호선(17b)(1) V_{GH} 게이트 신호선(17b)(2) V_{GH} 게이트 신호선(17b)(3) V_{GH} 게이트 신호선(17b)(4) V_{GH} 게이트 신호선(17b)(5) V_{GH} 게이트 신호선(17b)(6) V_{GH}											

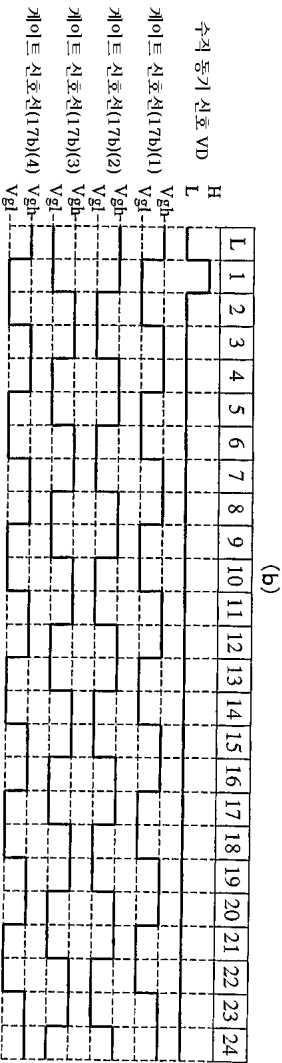
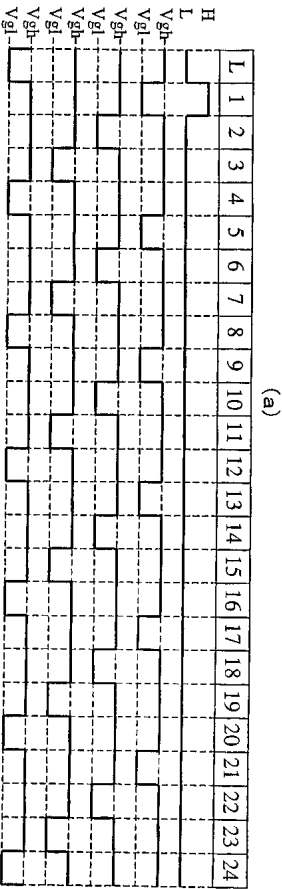
179



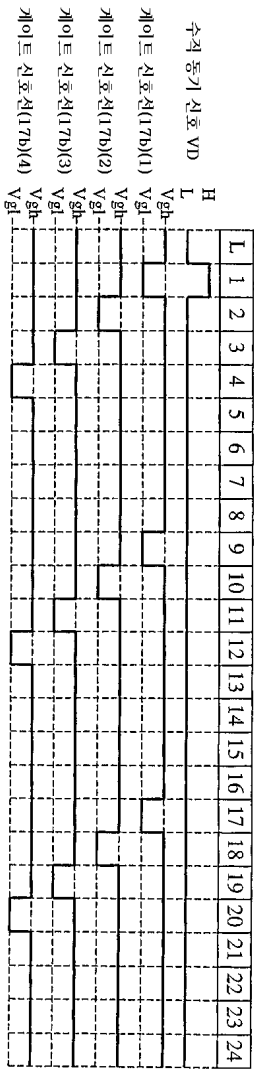


181

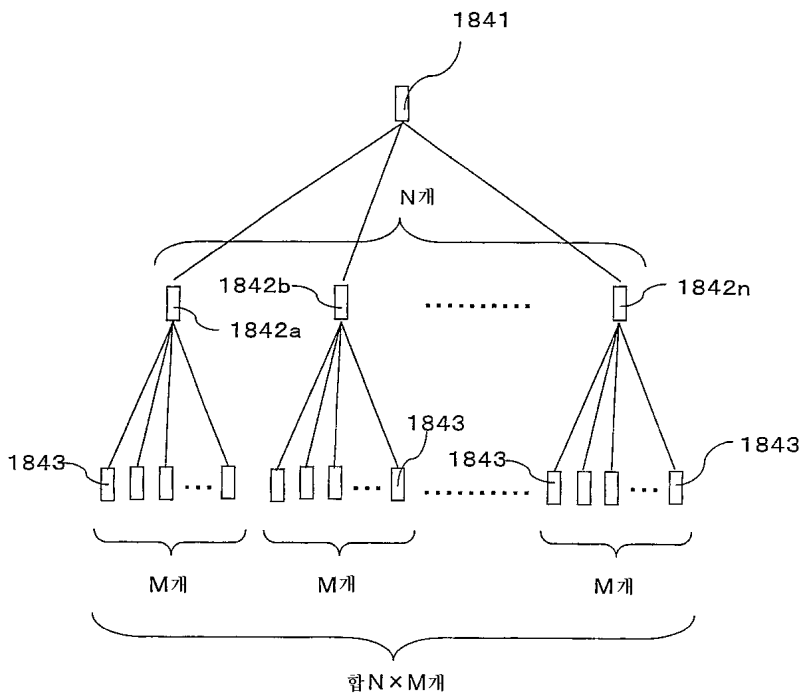
수격 동기 신호 VD	H	L	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	L																									
게이트 신호선(17b)(1)	V _{gh}																									
게이트 신호선(17b)(2)	V _{gh}																									
게이트 신호선(17b)(3)	V _{gh}																									
게이트 신호선(17b)(4)	V _{gh}																									



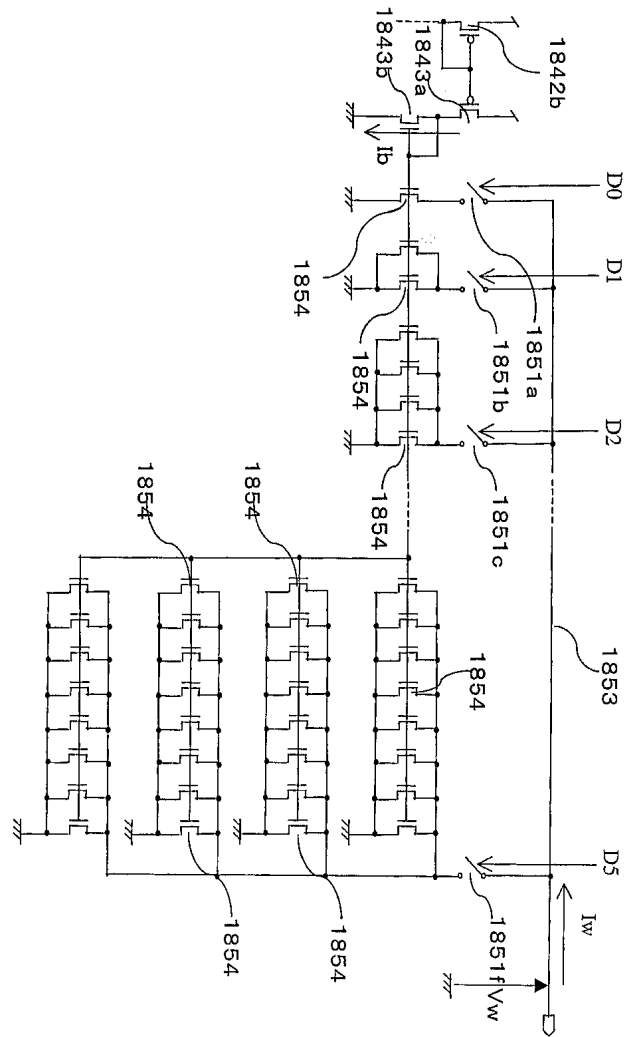
183



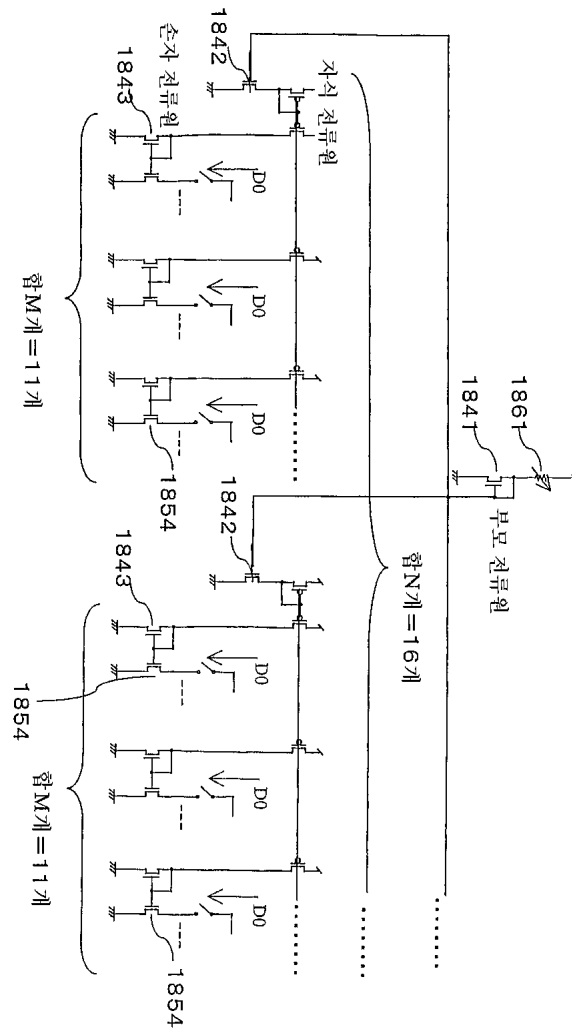
184



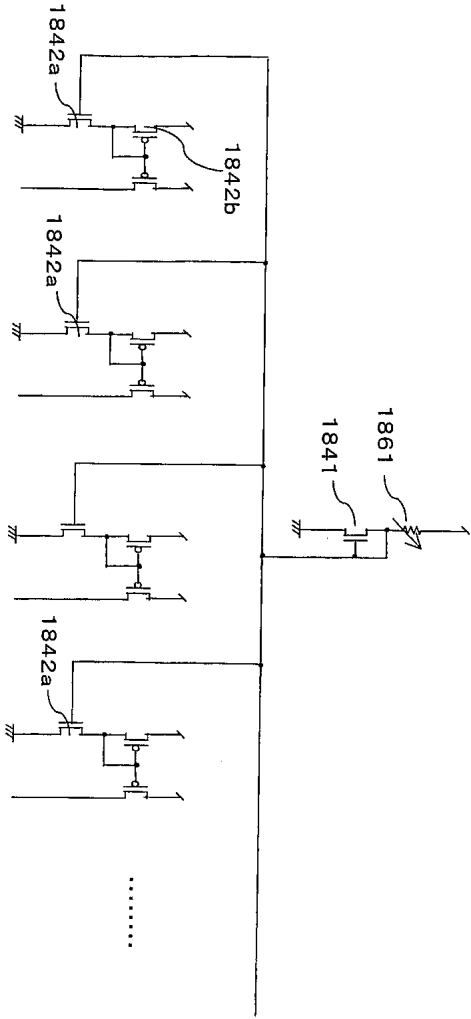
185



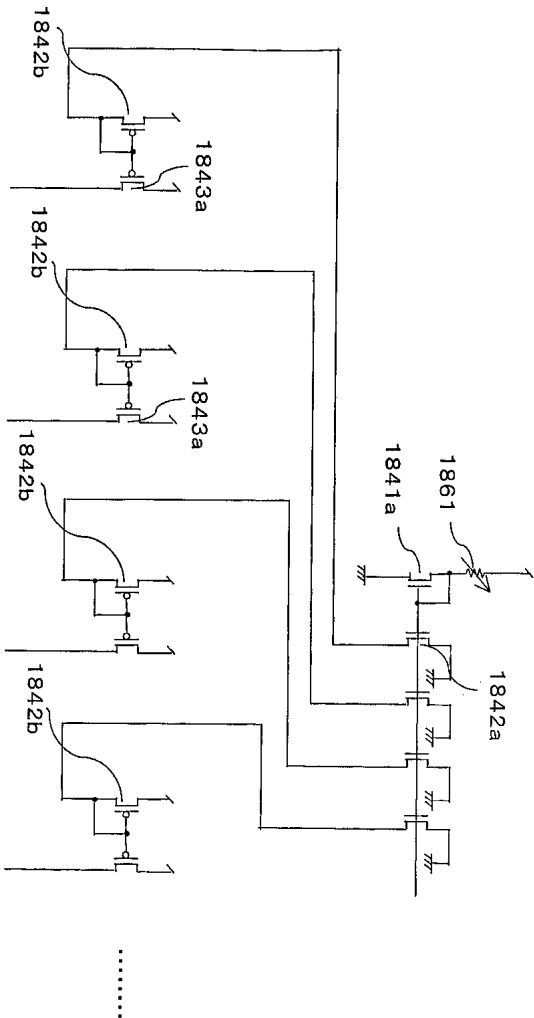
186



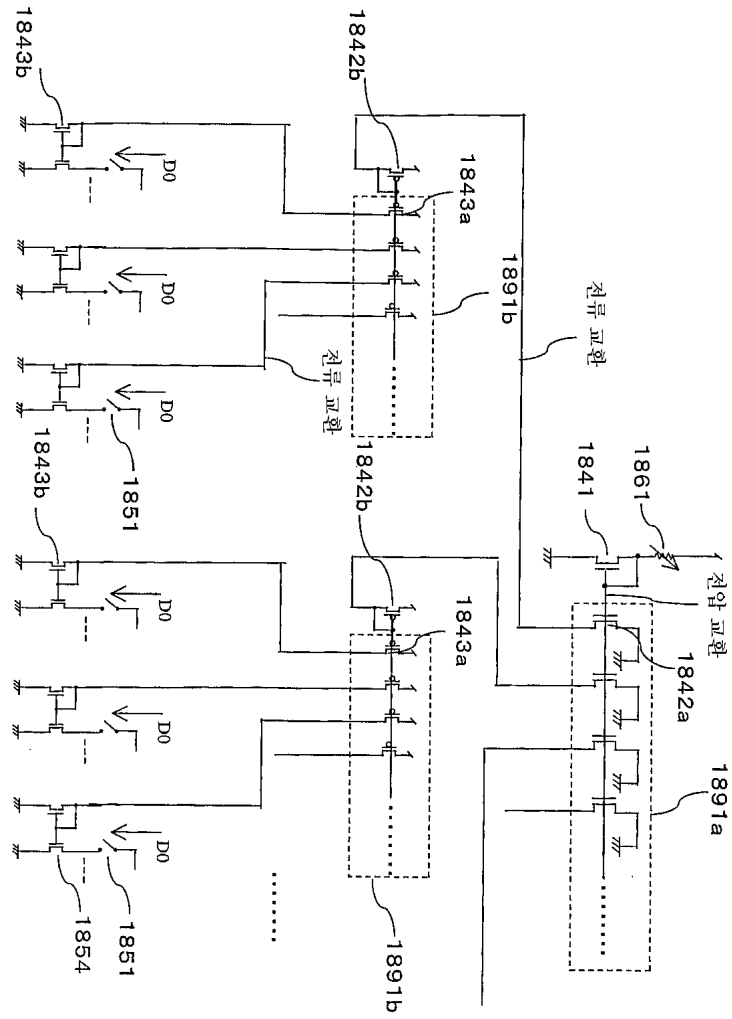
187



188



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专利名称(译)	EL显示器件		
公开(公告)号	KR1020050007342A	公开(公告)日	2005-01-17
申请号	KR1020047017263	申请日	2003-03-06
申请(专利权)人(译)	可否让我这个小粉丝展示中心		
[标]发明人	TAKAHARA HIROSHI 다까하라히로시 TSUGE HITOSHI 쯔게히토시		
发明人	다까하라, 히로시 쯔게, 히토시		
IPC分类号	G09G3/30 G09G3/20 H05B33/14 G09G3/00 G09G3/22 G09G3/32 H01L27/32 H01L51/52		
CPC分类号	G09G3/006 G09G3/20 G09G3/2014 G09G3/22 G09G3/3241 G09G3/325 G09G3/3266 G09G3/3283 G09G2300/0408 G09G2300/0417 G09G2300/0452 G09G2300/0809 G09G2300/0842 G09G2300/0861 G09G2300/0866 G09G2310/02 G09G2310/0218 G09G2310/0251 G09G2310/0256 G09G2310/0262 G09G2310/027 G09G2310/0283 G09G2310/0297 G09G2310/06 G09G2310/061 G09G2320/0214 G09G2320/0223 G09G2320/0233 G09G2320/0261 G09G2320/043 G09G2320/0606 G09G2320/0626 G09G2320/066 G09G2320/08 G09G2330/02 G09G2330/12 H01L27/3213 H01L27/3218 H01L27/3223 H01L27/3244 H01L27/3276 H01L51/5253 H01L51/5259 H01L51/5262 H01L51/5281 H01L51/529 H01L2251/568		
代理人(译)	Jangsugil Yijunghui		
优先权	2002127532 2002-04-26 JP 2002127637 2002-04-26 JP 2002284393 2002-09-27 JP		
其他公开文献	KR100796397B1		
外部链接	Espacenet		

摘要(译)

为了充分地対源信号线的寄生电容充电和放电并用预定的电流值对像素晶体管进行编程，需要从电流输出的源极驱动电路输出相对大的电流。然而，当这样大的电流流到源信号线时，该电流值被编程到像素中，并且大电流相对于预定电流流到EL元件15。例如，当以N = 10倍的电流执行编程时，在EL元件15中流动10次电流，并且EL元件15以亮度十次发光。为了从中获得预定的发光亮度，电流流过EL元件的时间被设置为一帧（1F）的1/10。通过以这种方式驱动，可以充分地対源信号线的寄生电容进行充电和放电，并且可以获得预定的发光亮度。14 指数方面 晶体管，EL元件，驱动晶体管，驱动电路，信号线和编程电流。

