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2004 10 12

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2004 04 02

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JP-P-2003-00101124 2003 04 04 (JP)
JP-P-2004-00046699 2004 02 23 (JP)

(71)

가 가
100-6334

2- 4-1

(72)

2 4-1가 가

2 4-1가 가

가

2 4-1가 가

2 4-1가 가

1 5-1 가 가

1 5-1 가 가

1 5-1 가 가

(74)

:

(54)

MM00
CG0 1.5V 가 (9) MG0 8V , SL0 5V ,
(14) Lo 가 , (15) Hi
BL0 1μA , MM00 (12) 1μA 가 ,

2

, , , , , ,

- 1 .
- 2 1 , , .
- 3 2 .
- 4 1 / / .
- 5 1 .
- 6 1 가 가 .
- 7 1 가 가 .
- 8 7 .
- 9 .
- 10 1 , , .
- 11 10 .
- 12 10 CG .

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- 1 : ()
- 1a : ()
- 2 :
- 3 :
- 4 :
- 5 :
- 6 :
- 7 :

8 :

9 :

10 :

11 :

11a : ()

12 : ()

13 :

14 :

15 :

16 : ()

17 :

18 :

18a, 18b :

19, 20 :

21 : CPU()

22 : CPG

23 : DMAC

24 :

25 : SCI

26 : ROM

27 : BSC

28 : RAM

100 :

101 :

102 :

103 :

104 :

105 :

MM : ()

ZM : MOS
CM : ()
MC : ()
IOP1 IOP9 :
BL :
CG :
MG :
SL :
LBL :
MBL :

ductor) , , MONOS(Metal Oxide Nitride Oxide Semico
가 , , 가 MONOS
, MONOS (, 0.77 V) 10μA 가 (1).
0V
(2).
, AG-AND(Assist Gate AND) 2 ,
4V ,
, SSI(Source Side channel hot electron Injection) , 1
MOS ,

(3) , , 가 , , , , , - .

(4) , , 가 , , , , , - .

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, , . , .

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1 , , 2 , 1 , 3 , 2 , 4 , 1 / / 5 , 1 가 가 , 6 , 1 , 7 , 1 , 8 , 7 , 9 , .

, () (1) , 1 (2), (3), (4), (5), (6), (7), (8), (9), (10), (11) .

(2) , (3) , (10) , (10) , 가 (4) , .

(4) , (5), (6)가 (5) , (4) () , (6) , (4) () .

(7) , / (8) , (9) , (3) , .

(10) , , 가 , .

(11) , (9) , (가) (11a) .

, (9), (11a) BLn , 2 (9) , BL0 , BL0

BL1 BLn (9) 가 .

(9) , (15) (12), (13), (14),
al Oxide Semiconductor) . (12), (13) , , N MOS(Met

BL0 (12), (13) BL0 .

MM00 MMn0 (102)(4) (100)(4) , CG0,
MG0 , (103)(4) , SL0 .

(12) , (11a)가 , (12)
) , (14) 가 . (12) , (12

(13) 가 , (13)
, (15) .

(13) , ON , OFF가 , .
(15) , .

(15) , (14) 가 , (14)
, 가 .

(12) .

3a , (12)
(12) , . ,

(12) , , 2
, .

, 3b , (12)
, (12) , . 3b

(12) , 2 ,
. .

, 3c - - - 3c ,
- , - .

, (12) , - -

, (11a) , (16) (17) .
(16) (12) 가 . (16) , (17) ,

, MM , / / 4 .

1 MM , 4 , MOS MOS 2
MM , (103), (104)

(103)- (104) (105) (101),
(100)가 , (102)가 .

(101) , , .

MM 4a (100) 8V ,
 (103) 5V , (105) 0V 가 , (102), (104) , (104
)- (103) 1 μ A 가 가 ,
 (101) . 가

MM 4b (100) 10V ,
 , (102) 1.5V , (103), (104) , (105) 0V 가
 (101) 가 (100) MM 가 .

4b , (100) 8V 가 , (100) 가 .

MM 4c (102) 1.5V ,
 (104) 1.0V , (100), (103) , (105) 0V 가 ,
 .

4c , (100) 0V 가 , (100) 가 .

(1) .

MM00 (9) .

MG0 , 8V , SL0 5V , CG0 1.5V 가 .

(9) 0, (15) Hi , (14)
 Lo 가 , (12) , 1 μ A 가 , BL0 1
 μ A MM00 .

MM01 , 8V , 5V , 1.5V 가 가 ,
 MM01 (9) , 1 (15) Lo ,
 (14) Hi 가 .

Hi MOS , 1.5V , (9) , BL1 1.5V , MM
 01 가 ON , .

MMn0, MMn1 , (100), (103), (102)
 가 .

(12) , 가 , 4 .

5 , (1) .

5 , CG0, MG0, SL0, BL0, BL1 .

MM00 CG0 1.5V 가 ,
 SL0 5V , BL0, BL1 1.5V 가 , MG0 8V 가 .

BL0, BL1 , MG0 8V 가 1.5V 가 .

CG0, SL0, MG0 BL0, MM00 (9)

2, 5, MM01, MM00, (9), MM01, BL

BL1 가

MMn0, MMn1 CGn, SLn, MGn

0V

(9) 5, MM00 (9), BL0, BL1

MM01 (9)

6, (1) (10)가 가

(9), (11a) 2

MM(4), (100), (103), CG0 CGn, MG0 MGn, (102), SL0 SLn

MM MBL (104), LBL, MOS ZM

MBL, (9)가, MOS ZM

Z0

5V, MM00, CG0, (15), 1.5V Hi, MG0, Z0, 1.5V, 8V, SL0, (9), 0, (14), 가, Lo 가

(12), 1 μ A, 가, MBL0, 1 μ A

MM01, (100) 8V, (103) 5V, (102) 1.5V (15)

Lo 가, MM01 (14) Hi 가

Hi, 1.5V, (9), MBL1 1.5V

MM01 MOS 가 ON

MMn0, MMn1 (100), (103), (102) 가

가, 6, Z 1.5V 가, 5, LBL 1.5V

SL0 5V, BL0, BL1 1.5V 가

7, (1) (10)가 가

MM(4), (100), (103), CG0 CGn, MG0 MGn, (102), SL0 SLn

MM (104), LBL, MOS ZM0, Z

M1 MBL

LBL, CM, (18)가 CM, (18), (17)
 (18), 2 (18a, 18b)가 (18b) N MOS
 (18a), P MOS, NMOS (18)
 (12) N MOS, PMOS
 (18a), (18a, 18b) CM 가
 (18b), (11a) (17)가
 MBL, MOS ZM0, ZM1, LBL 2
 MBL, (9)가 LBL, LBL
 MOS ZM0, ZM1, Z0, Z1
 (9), 2 가 (12), (13)
 (15), (19, 20)가 (11a)
 (19, 20), N MOS (19), (12)
 (19) (20) 가 (20)
 (VSS)가
 (19), (15) 가 (15)
 ON/OFF ON/OFF
 MM00 CG0 1.5V, MOS Z0 1.5V 가, 8V, SL0 5V
 (9) 0, (15) Hi, (19, 20)가 ON,
 n1 Lo 가
 (12), MM00 1 μ A 가, MBL0, 1 μ A
 MM01, (100) 8V, (103) 5V, (102) 1.
 5V 가
 MBL0 LBL1, MOS ZM1
 LBL1, MM01
 LBL1, 1.5V CM CM1 LBL1
 가 LBL CM,
 P MOS
 CM LBL, 0.5 μ A
 2, CM LBL (9) BL 1.5V 가, 7
 LBL 1.5V (9) 1.5V

, (9) 1, (15) Lo , (19),
 (20)가 OFF , n1 , (9) MBL1 .
 , (9) 1.5V MMn0, M
 Mn1, MMn2, MMn3 , (100), (103), (102) 가 ,
 , 7 가 CM 0.5 μ A
 (12)) , 1 μ A , (9) 1.5 μ A 가 .
 , CM , CM ,
 가
 OS , 7 , (12) N MOS , CM P M
 , (11a) CM ,
 , (19, 20) .
 , 7 MM00 8 .
 , 8 CG0, MG0, SL0, MOS
 Z0, LBL0, LBL1, LBL2, LBL3, MBL0, MBL1
 , CG0 1.5V 가 , SL0 5V , MOS Z0 1.5V
 가 , , CM ON , LBL0, LBL1, LBL2, LBL3 1.5V
 가 , MG0 8V 가 .
 LBL0, LBL1, LBL2, LBL3 , MG0 8V 가 1.5V 가
 CG0, SL0, MG0 MBL0 , MM00 (9)
 , MM02
 7 , MM02
 , 8 MM00 , (9) , MBL ,
 MBL1 가 , MM02 .
 , MMn0, MMn1, MMn2, MMn3 CGn, SLn,
 MGn 0V .
 (9) 8 , MM00 (9),
 MM02 (9) , MBL0, MBL1 .
 9 , () MC
) MC , (1)(1) ()
)(1a) LSI , CPU() (21), CPG(22), DMAC(23),
 (24), SCI(25), ROM(26), BSC(27), RAM(28), IOP1 IOP9 .
 CPU(Central Processing Unit)(21) , ROM(26) MC

ROM(Read Only Memory)(26) , CPU(21) . RAM(Random Access Memory)(28) , CPU(21) , CPU(21) .

DMAC(Direct Memory Access Controller)(23) , ROM(26), RAM(28) .

SCI(Serial Communication Interface)(25) , (24) , , , .

CPG(Clock Pulse Generator)(22) , , , IOP1 IOP9 , .

MC , CPU(21), (1a), ROM(26), RAM(28), DMAC(23), IOP1 IOP5가 IAB, IDB .

(24) SCI(25) IOP1 IOP9 , PAB, PDB .

BSC(27) , IAB, IDB PAB, PDB .

(12) , , MM , , MM 가 가 , (1, 1a) .

(1) (10)가, 2, 6, 7 , , (10) , .

10, 11 , 2 MM00 MMn0 가 CG0 1.2V 10 가 , 2 (102) (102) (100) .

1.2V CG 1.5V 가 , (100) (100) 1.2V 가 , , 가 .

CG 1.2V 가 , (100) 가 .

12 CG , CG 가 CG 가 1.5V 1.2V , CG 1.5V 가 , , 1.2V , 1.5V 1.2V 가 , , 가 가 , .

- (1) , .
- (2) , (1) , .
- (3) , (1), (2) , .

(57)

1.

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2.

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3.

2 ,
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 가 , 가,

4.

2 3 ,
 가 ,
 , 1 ,
 가 .

5.

1 ,
 가 ,
 ,
 ,
 가 .

, 1 가 , .

9 13. , 가 ,

, 가 , .

9 14. 13 , 가 .

9 15. 14 , 2 .

15 16. , , .

17. , ,

1 가 , 2 가 , ,

- 1 , 2 3 3 , 4 가 .

17 18. , 가 1 1 3 4 1 .

18 19. , 1 3 4

20.

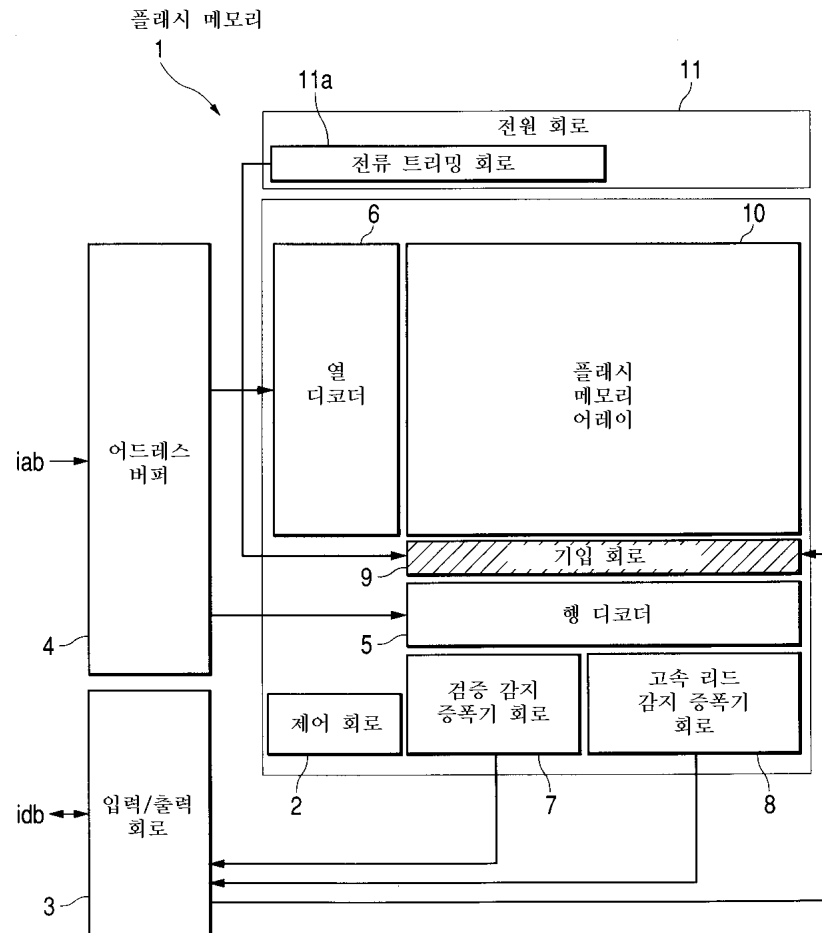
18

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3

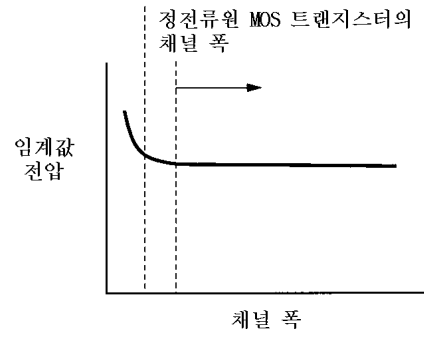
4

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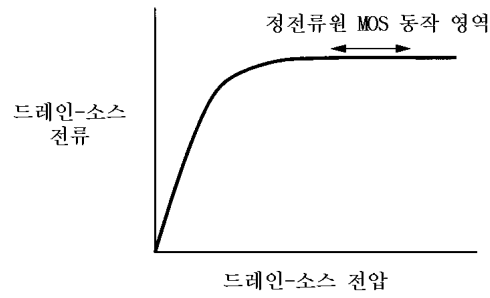


3b

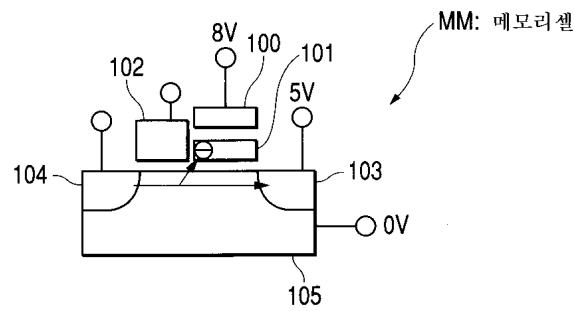
메모리셀 트랜지스터의
채널 폭



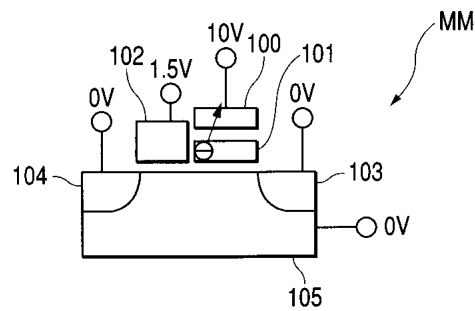
3c



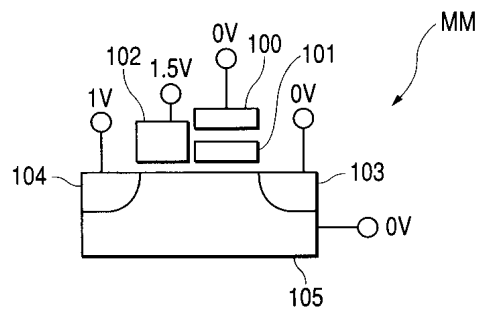
4a



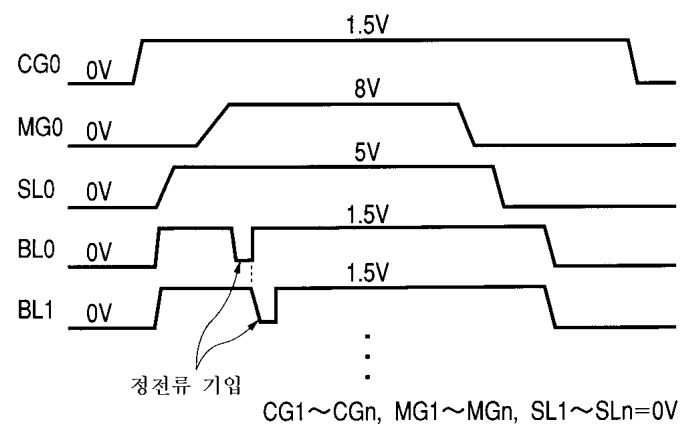
4b



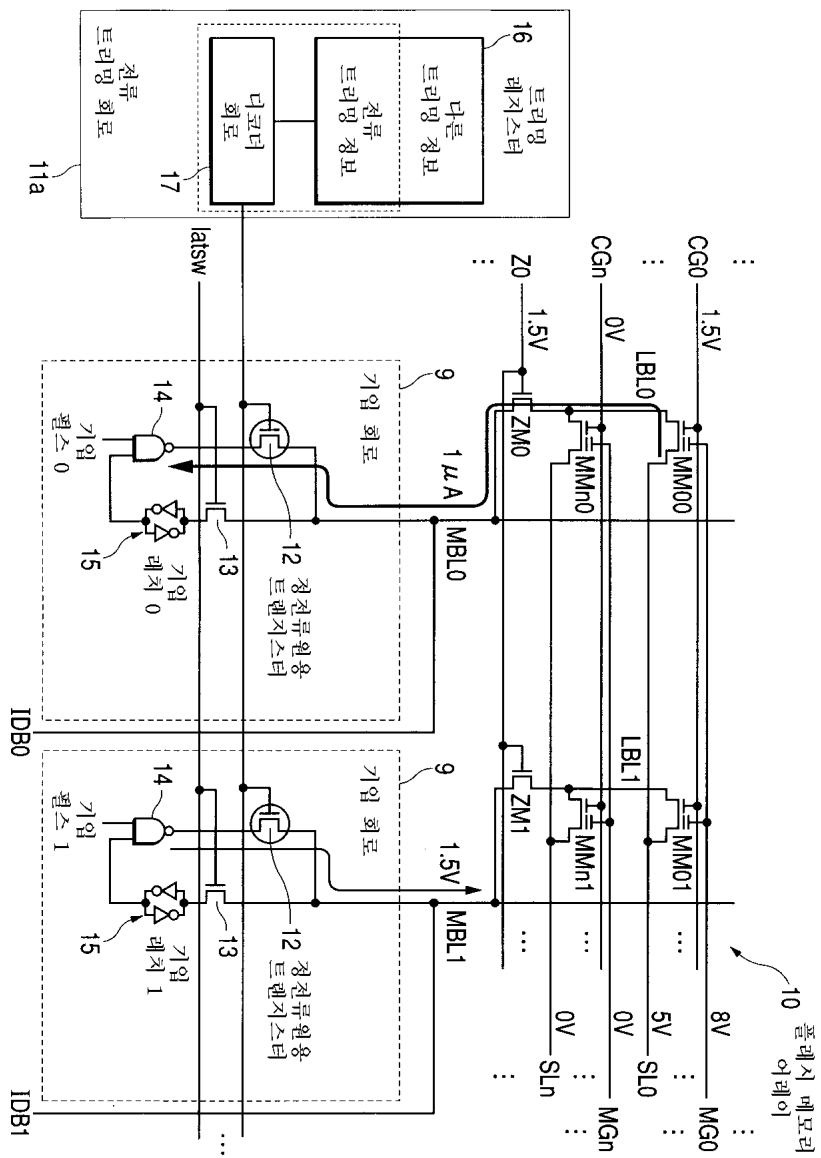
4c

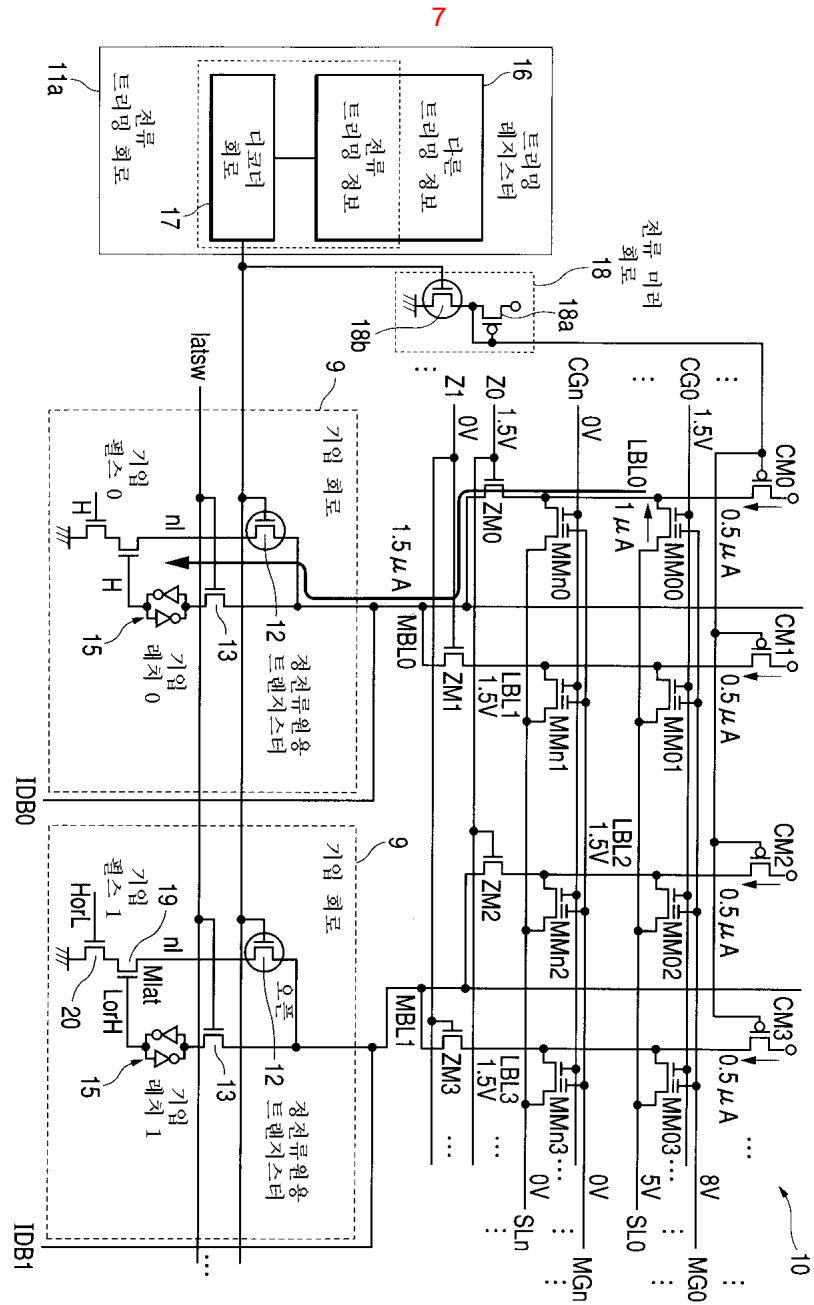


5

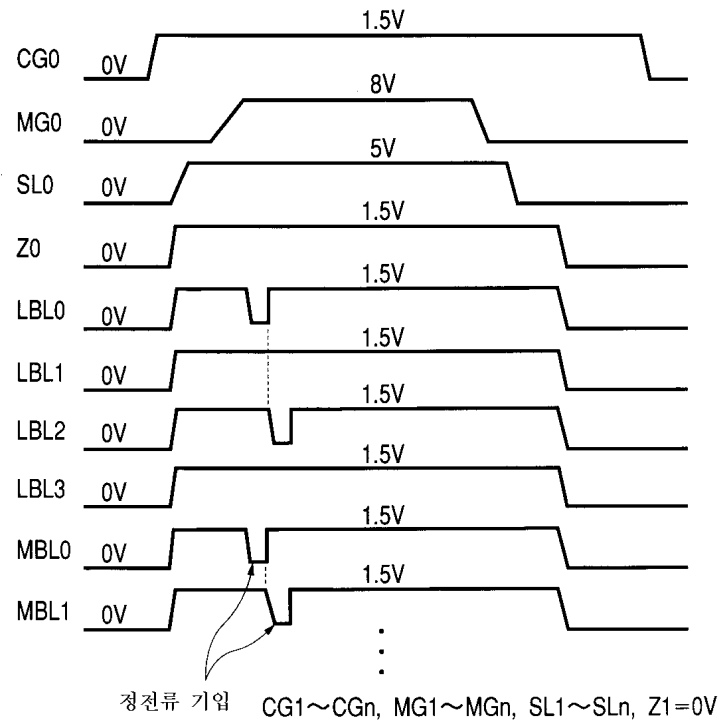


9

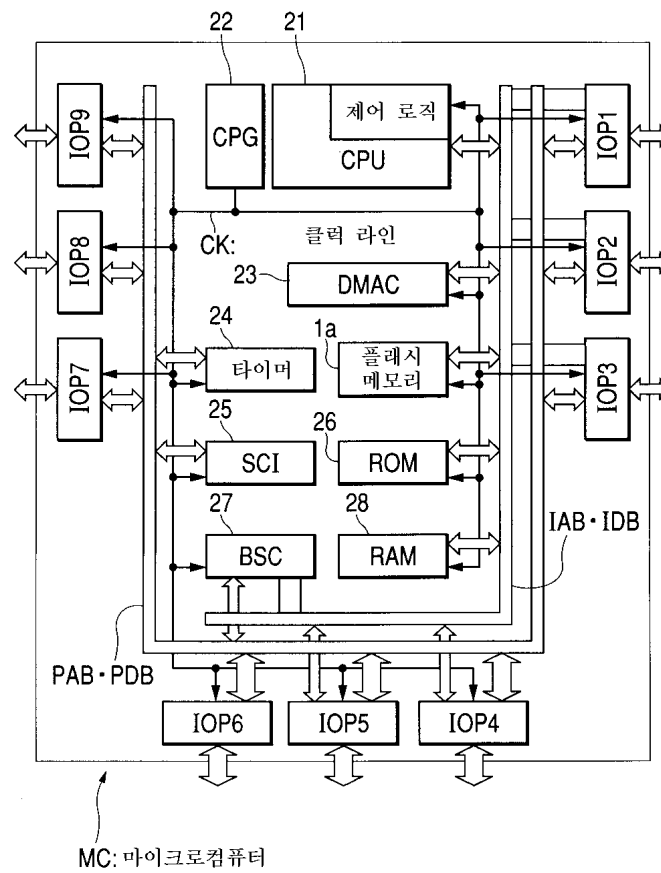




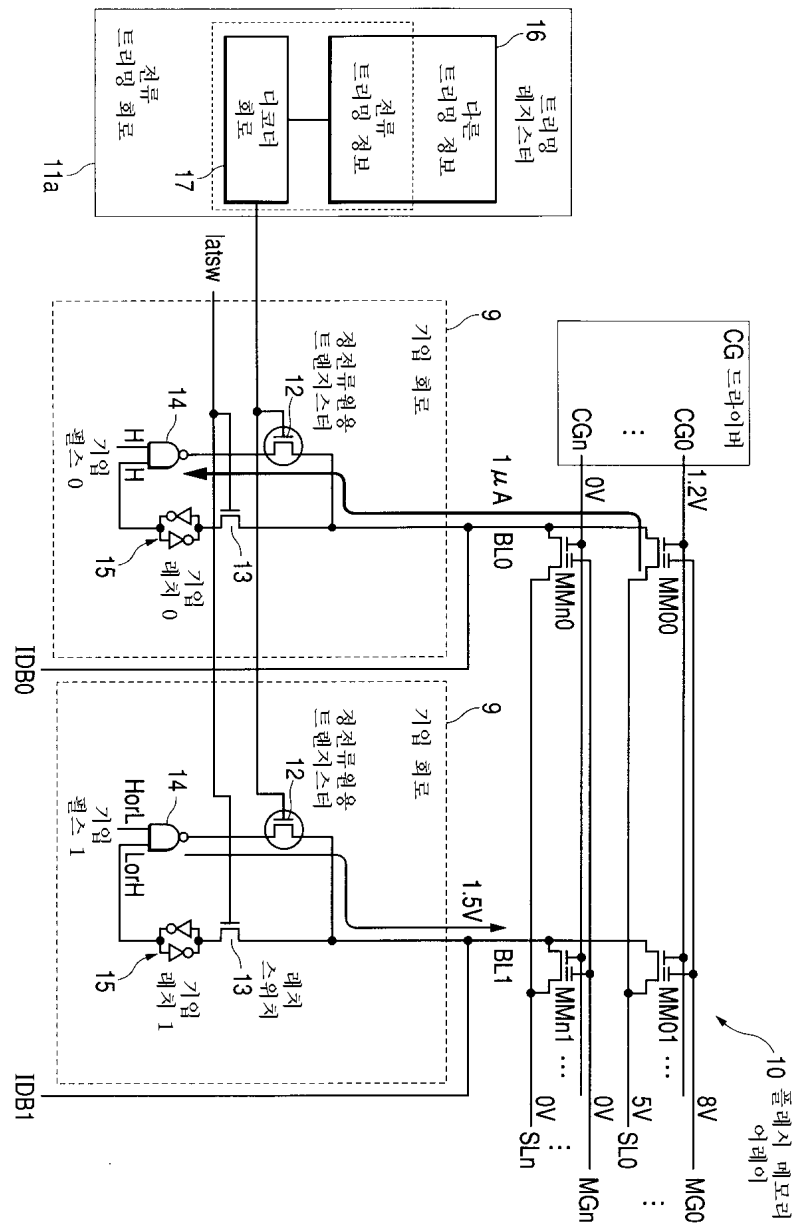
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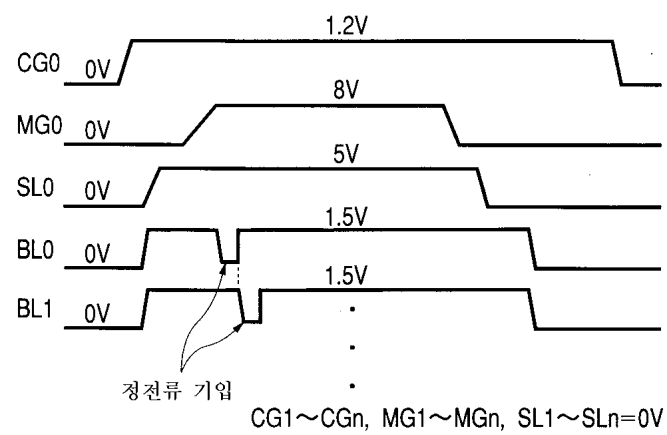
9



10



11



12

