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(71) 가 가

1 1 1

(72) 가 가 가 가 1 가 가

가 가 가 가 1 가 가

가 가 가 가 1 가 가

가 가 가 가 1 가 가

(74)

:

(54)

n MOS , 2 n MOS , 1 p MOS , 2 p MOS , 1
가 . 1 p MOS . 가 .
 , , . 2 p MOS

				1 p	MOS	
1 n	MOS					
		1 n	MOS			
				2 n	MOS	
2a						
1a						
1b						
1c						
2a	1			p	MOS	
2b	1			p	MOS	
3a	1			n	MOS	
3b	1			n	MOS	
4a	1					
4b	1					
4c	1					
5	2		(1)			
6	2		(2)			
7a	2		(3)			
7b	2					
7c	2					
8	3		(1)			
9	3		(2)			
10a	3		(3)			

10b 3

10c 3

IC (, IC) 가 , IC 가 (,)가 (OS , , 1a~ 1c .

1a . 1b , 1c

OS 1a , p MOS (, pMOS ; P11) n M (, nMOS ; N11) .

pMOS (P11) , (Vcc)가 (TV)가 nMOS (N11) (TV)가 , (G ND)가 (TG)가 , pMOS (P11) (TG)가

1b . p (101) n (102) , n (102) (103) (104) n (102) (p⁺ ; 104), (p⁺ ; 105) (104) (105) () (107) , pMOS (P11)가 .

p (101) (n⁺ ; 121), (n⁺ ; 122) (1 21) (122) () (124) , nMOS (N11)가 .

pMOS (P11) (104), (107), n (102) (TV)가 nMOS (N11) (122) (TV)가 , (121), (124), p (101) (TG)가 , pMOS (P11) (105) (TG)가 .

1c . pMOS (P11)

(104) (105) (104) (105)
 (107) (104) (104A)가 (105)
 (105A)가 (107) (104A)

(107) (105A) (107) (104A)

nMOS (N11) (121) (122)
 (121) (122) (124) (121)
 가 (122) (122A)가 (121) (121A)
 (124) (121A) (124)

(TV) (TG) 가
 가 가 (耐量)

S 가 가 가 1 p MO
 가 1 p MOS 가 1 p MOS
 2 p MOS 가 1 n MOS
 가 1 n MOS 2 n MOS

()

1

MOS 1 (, nMOS) p MOS (, pMOS) n

2a 1 p MOS 2b p M

2a , p (11) n (12) n (12)
 (p⁺ ; 15) (14) (15) (p⁺ ; 14),
 (15) (p⁺ ; 16) (14)

(14) (16) () (17)
 (16) (15) ()
 (18)

17) (14), (16), (14) (16) , ()
 pMOS (P1)가 , (16), (15), (16)
 (15) , (18) pMOS (P2)가 .

pMOS (P1) (14), (17), n (12) (Vcc)가
 (TV)가 pMOS (P2) (15), (18) (GND; ,
)가 (; TG)가 .

p MOS (P1, P2) (P1, P2) 2b pMOS
 (14) (16) (14), (16) (15) .
 (18) (17) , (16) (15)

(14) (14) () (14A)가
 (15) (15) () (15A)가
 , (15A) (18) (14A)

p MOS (P1, P2) , p MOS (P11) 가
 () (TG) () (18)) 가
 , pMOS (P1, P2) (14), (16), (15)
 pMOS (P11) (104), (105)
 , pMOS (P11)

p MOS (P1, P2) (TV) (Vcc) , (TG)
 (18) , (18) 가 , 가,
 가 (TV) , (Vcc) (pMOS (P11)) (14) (15)
 가 (TG)

, n MOS

3a 1 n MOS . 3b n M
 OS

3a , p (11) (13)
 . p (11) (n⁺ ; 21) (n⁺ ; 22)
 . (21) (22) (21) (22)
 (n⁺ ; 23) .

(21) (23) (22) () (24)

(25) (23)

24) (21), (23), (21) (23) () (23)
nMOS (N1)가 , (23), (22), (23)
(22) , (25) nMOS (N2)가 .

nMOS (N1) (21), (24), p (11) (GND)가
(TG)가 . nMOS (N2) (22), (25) (Vcc)가
(TV)가 .

n MOS (N1, N2) 3b . nMOS
(N1, N2) (21), (23) (22)
(21) (23) (24) , (23) (22)
(25)

(21) (21) () (21A)가
(22) (22) () (22A)가
, (22A) (25) (21A)

(24)

n MOS (N1, N2) n MOS (N11) 가
() (TV) (25)
, nMOS (N1, N2) (21), (23), (22)
nMOS (N11) (121), (122)
, nMOS (N11)

n MOS (N1, N2) (TG) (GND) , (TV)
(25) , (25) 가 가
가 , (21) (22)
(TG) , (GND) (nMOS (N11)
가 (TV)

, p MOS (P1, P2) n MOS (N1, N2) 1

4a 1 . 4b , 4c

, 4a p MOS (P1, P2) n MOS (N1, N2)

pMOS (P1), pMOS (P2), (Vcc)가, (TV)가, pMOS (P2), (TV)가, (GND)가, (TG)가

nMOS (N1), nMOS (N2), (TG)가, nMOS (N2), nMOS (N1), (TV)가

a nMOS (N1, N2) 4b, 2a pMOS (P1, P2), (TV) (TG) 3

2) 3b nMOS (N1, N2) 4c, 2b pMOS (P1, P2), (TV) (TG) 3

1 (Vcc)가, (GND)가

(18) (TV) (Vcc) (TG)가, (14) (15) (pMOS (P11)) (TG) 가

5) (TG) (GND) 가, (TV)가 (25) (2) (nMOS (N11)) (TV) 가 (TG) (GND)

2

TV) 2 (I/O) 1, 2a 2b pMOS (P1, P2) (TG) (I/O) 2, 3a 3b nMOS (N1, N2) 3

5 2 (1)

(5) pMOS (P1) (14), (17), n (Vcc)가 (TV)가, pMOS (P2) (15), (18) 가 (I/O)가

(TV) (Vcc) (I/O) 가
 가, (18) , (18) (pMOS 가
 (14) (15) 가 , (P11)) (I/O) (TV) (Vcc) ,
 , (I/O) 가 .
 , 6 2 (2) .
 , 6 nMOS (N1) (21), (24), p
 () (GND)가 (TG)가 . nMOS (N2)
 (22) (25) 가 가 (I/O)가 .
 3b 가 .
 (TG) (GND) (I/O) 가
 가, (25) , (25) (nMOS 가 ,
 (21) (22) 가 , (N11)) (I/O) (TG) (GND) ,
 , (I/O) 가 .
 , 7a 2 (3) . 7b
 , 7c .
 , 7a p MOS (P1, P2) n MOS (N1, N2)
 .
 pMOS (P1) , , (Vcc)가 (TV)가
 . pMOS (P1) pMOS (P2) . pMOS (P2) (I/O)가
 (TV)가 , 가)
 nMOS (N1) , , (GND)가 (TG)가 .
 nMOS (N1) nMOS (N2) . nMOS (N2)
 (I/O)가 , (TG)가 .
 3a nMOS (N1, N2) 7b , 2a pMOS (P1, P2) , (I/O)
 /O) (TV), (TG), (I

pMOS (P1) (14), (17), n (12) (Vcc)가 (TV) 가 . pMOS (P2) (15), (18) 가 (I/O)가 .

nMOS (N1) (21), (24), p (11) (GND)가 ((TG)가 . nMOS (N2) (22), (25) (I/O)가 .

2) , 3b nMOS (N1, N2) 7c 2b pMOS (P1, P (I/O) 7b (TV), (TG), (Vcc) (18) (I/O) 가 (Vcc) , (TG) (18) (GND) , (pMOS (P11)) (14) (15) 가 (TV) (Vcc) , (TG) (18) (GND) , (I/O) 가 (I/O) 가 (25) (nMOS (N11)) (21) (22) 가 (TG) (GND) 가 (I/O) 가 .

3 (I/O) , 3 2a, 2b pMOS (P1, P2) ((TG), (TV) 1 , 3a, 3b nMOS (N1, N2) (I/O), (I/O), (TG), (TV) 2 , 1 2 3 .

8 3 (1) .

(8) pMOS (P1) (14), (17), n (P2) (Vcc)가 (TV)가 . pMOS (P2) (GND)가 (TG)가 (I/O)가 . pMOS (P2) 2b (15) 가 .

p MOS (P1, P2) , (TV) (Vcc) , (TG)

(15) (18) 가 (18) 가, (14)
 가 (TV) (Vcc) (pMOS 가 (P11)) (TG)
 (I/O) 가
 9 3 (2)
 (22) (25) (Vcc)가 가 nMOS (N1) (TG)가 (21), (24), p (N2)
 가 (I/O)가 nMOS (N2) 3b
 2) (25) 가 (TG) (N1, N2) (TG) (GND) (TV) (25) 가 (N11) (TV) (2)
 (I/O) 가
 10a 3 (3) 10b
 10a p MOS (P1, P2) n MOS (N1, N2)
 pMOS (P1) (P1) pMOS (P2) (Vcc)가 (TV)가
 pMOS (TV)가 (GND)가 pMOS (P2) (TG)가
 nMOS (N1) (TG)가 nMOS (N1)
 nMOS (N2) (TG)가 nMOS (N2) (TV)가
 pMOS (P2) nMOS (N2) 가
 (I/O)가

3a nMOS (N1, N2) 10b , 2a pMOS (P1, P2) , (I/O) (TV), (TG), (I/O)

pMOS (P1) (14), (17), n (12) nMOS (N2) (25) (Vcc)가 (TV)가 . nMOS (N1) (21), (24), p (11) pMOS (P2) (18) (GND)가 (TG) 가 . pMOS (P2) (15) nMOS (N2) (22) 가 (I/O)가 .

, P2) , 3b nMOS (N1, N2) 10c , 2b pMOS (P1, (I/O) 10b (TV), (TG), (I/O)

p MOS (P1, P2) , (TV) (Vcc) , (TG) (18) , (18) 가 가, (14) (15) 가 . (pMOS (P11)) (TG) 가 가 , (TV) (Vcc) ,

(TV) n MOS (N1, N2) , (TG) (GND) , (25) , (25) 가 가, (21) (22) 가 . (nMOS (N11)) (TV) 가 가 , (TG) (GND) ,

(I/O) 가 .

가 가

(57)

1.

가 ,

가 ,

MOS , , , , , 가 1 p

p MOS 가 , , 1 p MOS 2

MOS , , , , , 가 1 n

n MOS 가 , , 가 1 n MOS 2

2.

1 가 , , 가

3.

가 ,

가 ,

MOS , , , , , 가 1 p

2 p MOS 가 , , 가 1 p MOS

4.

3 , 가 ,

MOS , , , , , 가 1 n

2 n MOS 가 , , 가 1 n MOS

5.

3 , 가 , 2 p MOS 가 가 , 2 p MOS

6.

가 ,

가 ,

MOS , , , 가 1 n

2 n MOS 가 , 가 1 n MOS , 가

7.

6 , 가 , 2 n MOS 가 가 , 2 n MOS

8.

가 ,

가 ,

가 ,

MOS , , , 가 1 p

가 , 가 1 p MOS , 가 2 p MOS

9.

8 1 n MOS , , , 가

가 , 가 1 n MOS , 가 2 n MOS

10.

8 가 , , 2 p MOS 가 , 2 p MOS

11.

가 ,

가 ,

가 ,

MOS , , , , 가 1 n

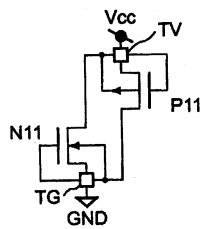
, , 가 1 n MOS , 가

2 n MOS

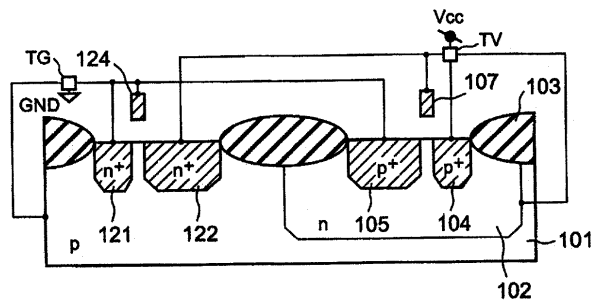
12.

11 MOS , 2 n MOS 가 , 2 n

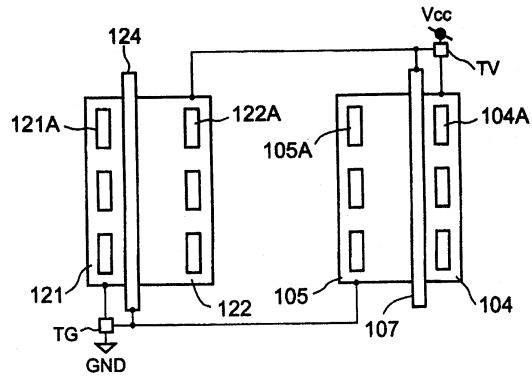
1a



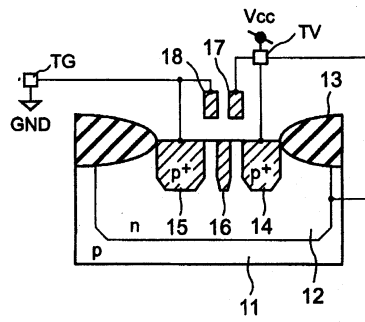
1b



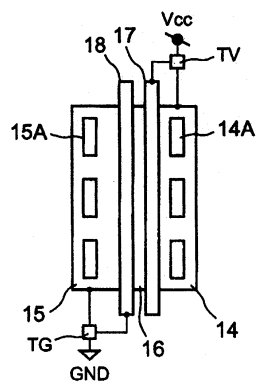
1c



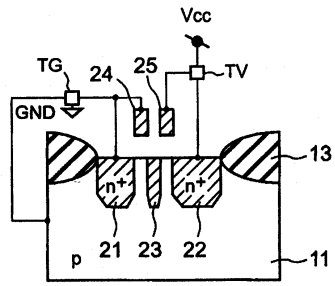
2a



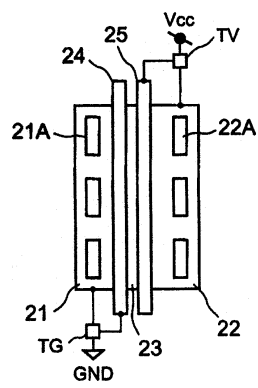
2b



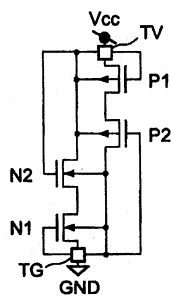
3a



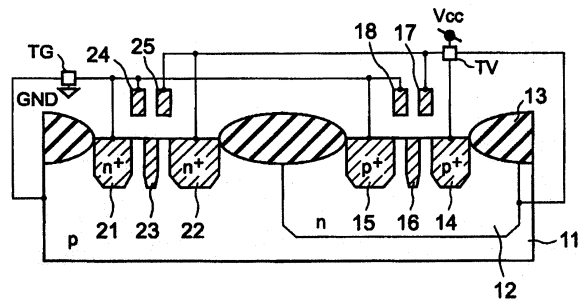
3b



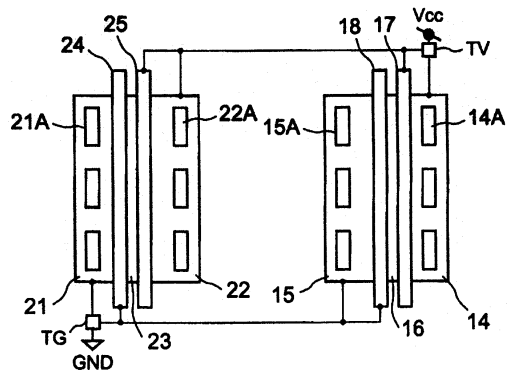
4a



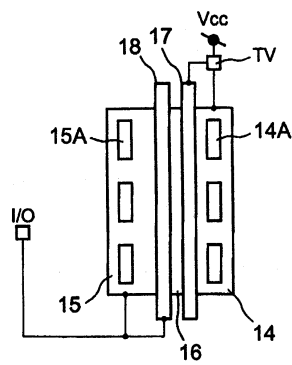
4b



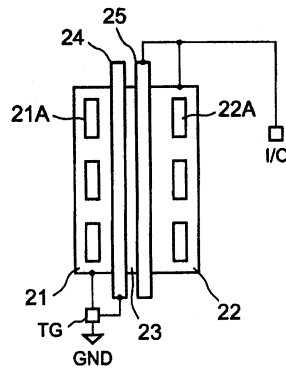
4c



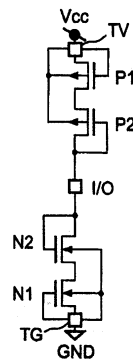
5



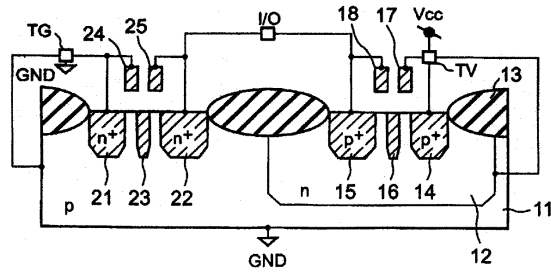
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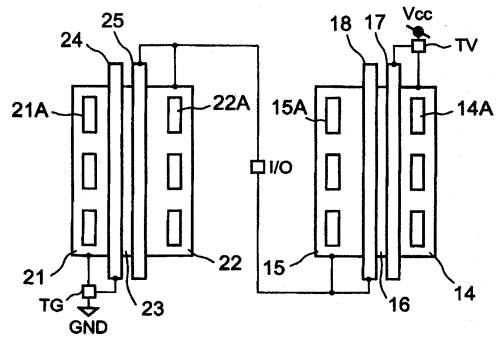
7a



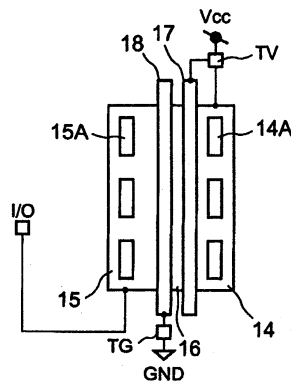
7b



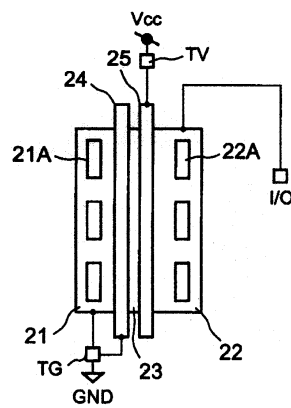
7c



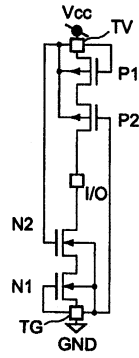
8



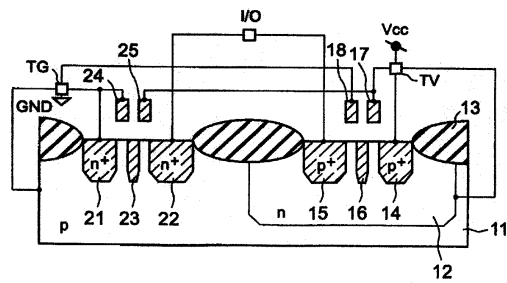
9



10a



10b



10c

