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(12)

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(B1)

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H01L 21/8244

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(11)
(24)

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10-0456688
2004 11 02

(21) 10-2002-0000677
(22) 2002 01 07

(65)
(43)

10-2003-0060142
2003 07 16

(73) 416

(72) 115 1704

416 702

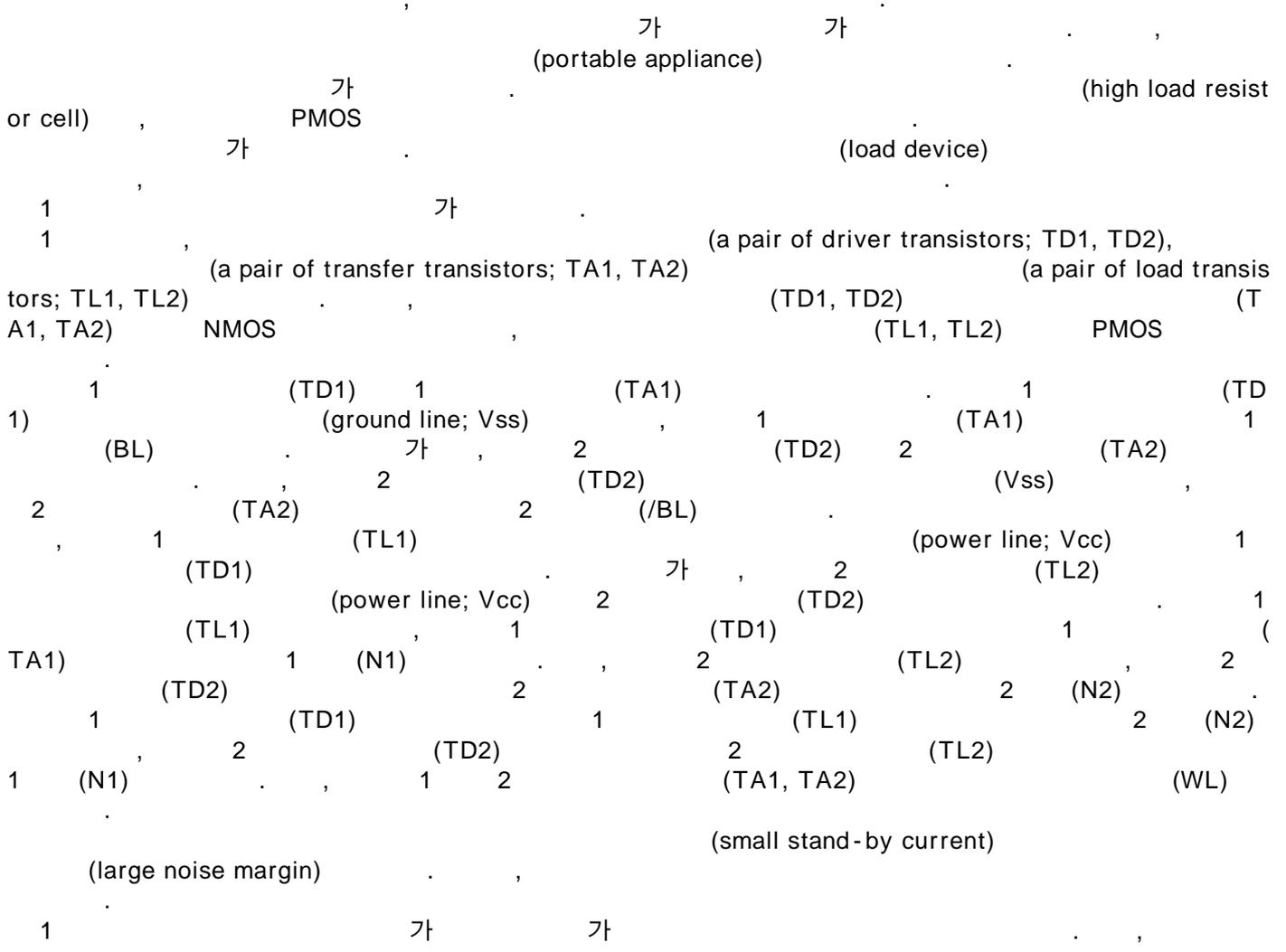
3 318 1406

(74)
:

(54)

1 2 가 1 가 1 2 1 2
1 1 1 가 , 1 1 1 2
2 2 가 , 2 2 1 2
1 , 1 1 2 가 1 가 2
1 , 2 가 2

1				가	
2					
3					
4					
5					(power lines)
6					(grou
7a	11a	2	6	-	
7b	11b	2	6	-	
7c	11c	2	6		



가 가

(noise margin)가

(cross-coupled)
e conductive layers)

(latch circuit)
(compact cell)
가

(doubl

(straight word line)
가

(aspect)
가

(power source region)
가

(ground source region)
가

(cross-coupled)
가

(straight word line)
가

가 , 2 4 4

4 , 1 2 2 1 1 1

가 1 2 1 2 (neighb

oring cell)

3 4

2 6 .y 2 x .y 4

x 2 x y 2 x

2 2 1 2 (35A, 35B) 1 (35A

) x 2 (35B) 1 (35A) 1

2 (35A, 35B) 가 1 (39A) 1 2

, 39B) 가 2 (39B) 1 2 (39A

TL2) 가 , 2 1 (35A) 1 2 (1 TL1

D2) 1 2 (39A, 39B) 1 (35A) (1 TD1 T

1 2 (TL1, TL2)

(power supply voltage) 가

2 (35B) 1 2 (39A, 39B) 가 1 (35A)

(driver transistor active region) , 1 2 1 (39A, 39B)

(ground source region)

2 (35B) 1 2

(first and second transfer transistor active regions)

(neighboring cell) 2 1 (35A) , 1

) 2 (35B) 1 , 1 가 3

(39C') 2 2 , 2 가

4 (39C') 1 2 (1 TA2)가

1 TA1)가 , 2 (1 TA2)가

3 4 (39C', 39C') x 3 4

(39C', 39C')

1 2 (TL1, TL2) PMOS 1 2 (TD

1, TD2) 1 2 (TA1, TA2) NMOS

1 4 (39A, 39B, 39C', 39C') 1

3 , 1 (39A) 1 (35A) 1 (58N')

1 3 (39A, 39C') 2 (35B)

1 1 (TL1) 1 (TD1)가 1

1 (58N') 1 (39A) , 1 (58N')

1 2 (35A, 35B) ()

가 , 2 (39B) 1 (35A) 2 (58N')

2 4 (39B, 39C') 2 (35B)

2 (TL2) 2 (TD2)가 2

2 (58N') 2 (39B) , 2 (58N')

1 2 (35A, 35B)

가 , 3 4 (39C', 39C') (straight word line; 58W)

(58W) x 3 4 (39C', 39C')

1 2 3 4 (39C', 39C') (58W) 2 (58W)
 (58W) (58N', 58N') (58W) (58W) 4 (39C')
 9C') (read mode) (write mode)
 (access time)
 4 (39B) 1 (58N') 1 (63NA) 2
 3 (63NC) 2 (63NB) (39A) 2 (58N') (63ND)
 1 2 (63NA, 63NB) 4 (63NB) 4 (63
 NC, 63ND) 2 (35B) 1 (35A) 3 4 (63
 (63C) (power line contact hole; 63C)
 (ground line contact hole; 63S) (63S)
 (63B', 63B') 1 2 1 2 (63B', 63B')
 2 (63NA, 63NB, 63NC, 63ND), (63C), (63
 S), 1 1 2 (63B', 63B') 8 8 가 4
 5 1 2 (63NA, 63NB) 1 (73I')
 1 (58N') 1 (73I') 2 (39B)
 1 (73I') (58W) 1 (58N') 2 (73I')
 39B) 가 가 가 3 4 (63NC, 63ND) 2 (73I')
 2 (58N') 2 (73I') 1 (39A) (58N')
 1 (39A) 가 (58W) 1 2 1 2 (73I',
 73I') (73I', 73I') 1
 2 (58N', 58N') (63C) (power line; 73C)
 (73C) (73S) (58W) (73S)
 73S) (63S) (63S) (73S)
 (73S) 2 (73S)
 (73S) (I
 ow voltage characteristic)
 1 2 (73I', 73I'), (73C) (73S) 3
 6 B', 79B') 1 2 (63B', 63B') 1 2 (79
 (79B', 79B') 1 2
 1 2 (83B', 83B') (73C) (73S) 가
 1 (83B') 1 (79B') 2 (83B') 2
 (79B') 1 (83B') 1 (79B') 1 (TA1)
 (63B') 가 2 (83B') 2 (79B')
 2 (63B') 2 2
 (TA2) 7a 11a 2 6
 11c 2 6 7b 11b 2 6 7a 11a 2 6
 2, 7a, 7b 7c (31) P (32P) N (32N)
 2P, 32N) (33) 1 2 (35A, 35B) P N (3
 N (32N) 2 (35B) P (32P) 1 (35A)
 B) (37) (37) 1 2 (35A, 35
 1 (refractory metal polycide

layer)

1 2 (35A, 35B) 가 1 2
 (39A, 39B) 2 (35B) 1 2 가 3 4
 (39C', 39C') 1 2 (39A, 39B)
 3 4 (39C', 39C') 1 2 (39A, 39B)
 1 (39A) 1 (1 TL1) 1 (1 TD1)
 (1 TD2) 2 (39B) 2 (1 TL2) 2 (1
 TA1) 4 (39C') 2 (1 TA1) (1
 3, 8a, 8b 8c 1 4 (39A, 39B, 39C', 39C')
 (33) 2 (35B) n n /
 1 1 2 (39A, 39B) (33)
 (35A) p p /
 1 4 (39A, 39B, 39C', 39C') (4
 1) / (37)
 1 4 (39A, 39B, 39C', 39C'), (33), (41)
 2 (35B) n n /
 1 2 (39A, 39B), (33) (41)
) 1 (35A) p p /
 1 (35A) (lightly-doped drain shape; LDD shape)
 p / 2 (35B) n /
 1 2 (39A, 39B) 2 (35B) 1 2
 (TD1, TD2) n (n-type ground source region; 43S')
 1 3 (39A, 39C') 2 (35B) 1 (TD1)
 (43D') 가 2 4 (39B, 39C') 2 (35
 B) 2 (TD2) (43D') 1 2 (TD1, TD2)
 (43D') 1 2 (TA1, TA2) (43S')
 2 (35B) 1 2 (TA1, TA2) (43D')
 가 1 2 (39A, 39B) 1 (35A) 1 2
 (TL1, TL2) (TL1, TL2) (45D) 1
 (35A) / 1 (50) 1 (5
 0) (47) 1 (49) (47)
 1 (49) (49)
 47) 1 (50) 1 (49) ()
 1 (50) 3 4 (39C', 39C')
 (51G) (51G) 가
 1 (50) 1 (TL1) (45D), 1
 (TD1) (43D') (33) 1 (53
 G') 2 (TL2) (45D), 2 (TD2) ()
 43D') 2 (33) 2 (53G') 1
 2 (53G', 53G') (51G)
 1 2 (53G', 53G') (51G) 2
 55) (57) (55) (barrier metal layer;
 (TiN) (WN)
 1 (50) 2 1 2
 (53G', 53G') (58N', 58N') (51G)
 (58W) 1 1 (TL1) (45D)
 1 (58N') 1 (TD1) (43D')
 가 2 (TL2) (45D) 2 (58N') 2
 (TD2) (43D')
 (TD1) 1 (TL1) 1 2 (TD2) 2
 (TL2) 2 가

() , .
 (73I', 73I') 6 가 1 2 (83B', 83B') 1 2 (83B')
 1 4 6 (81B') 2 (83B') 2 . 1 2
 , , / , , /
 , 1 2 1 2
 , 1 2
 RC (RC delay time) (acce
 ss time) , 2 2

(57)

1. 1 2 ;
 1 2 가 1 ;
 1 2 가 , 1 2 ;
 1 1 2 ;
 2 , 1 1 2 ;
 2 , 2 2 ;
 1 가 1 2 , 1 2 ;
 2 가 1 1 ;
 2 가 2 .
2. 1 ,
 1 2 1 2
3. 1 ,
 1 1 1 2 1 1 2
4. 3 ,
 1 1 ;
 2 2
5. 3 ,
 2 2
6. 1 ,
 2 2 3 2
 1 , 2 1 4
7. 6 ,
 3 3 ;
 4 4
8. 6 ,

4 1
 9.
 1 1 , 2 1 (neighboring cell)

10.
 9 1 ,
 11.
 1 2 , 1 2 2 1
 1 1 , 2 2 1 2 2 2
 1 1 3 1 2 2

12.
 11 1 2 , 가 (straight word line)
 1 1 2

13.
 11 1 , 1 ;
 2 , 2

14.
 11 3 ,

15.
 1 1 ; 1
 1 2 , 1 1
 1 1 가 1 ;
 1 ; 2 가 , 1 2 2
 ; 1 3
 ; 2 4

16.
 15 1 , 1 1 3 2
 2 , 1 1 2 4 ; 2
 1 , 2 ; 2
 가 1 ;
 2 가 1 , 2 1
 가 2

17.
 16 1 2 , 1 2

18.

16 1 , 1 1 1
 2 , 1 2 2 1 2
 2 ,

19.

18 1 2 , 1 2
 .

20.

18 2 , 2
 .

21.

16 2 , 2 3 2 4
 1 , 2 1 4
 .

22.

21 3 4 , 3 4
 .

23.

21 4 , 1
 .

24.

15 1 2 , 1 (neighboring cell)
 .

25.

24 1 ,
 .

26.

15 2 , 1 2 3 2 4 1
 ,

27.

15 1 , 1
 2 ; , 2
 .

28.

26 , ,
 .

29.

1 1 ; , 1 ,
 1 1 1 1 2 ; ,
 1 2 ; , 가 , ;
 ,

29 **30.**
 1 , 가 ,
 1 1 2 ; 가 , 3 ;
 1 2 가 가 , 3 ;
 2 4 ; 가 ,
 1 2 가 ,
 3 4 ,

30 **31.**
 1 , 1 1 3 2
 2 , 1 2 4 2
 1 2 , 2 ; 1 2
 가 1 ; , 2 1
 2 1 , 2 1
 가 2

31 **32.**
 1 , 1 1 1 2
 2 , 1 2 1 2

32 **33.**
 1 , 1 2 2

32 **34.**
 2 , 2

31 **35.**
 2 , 2 3 2 4
 1 , 2 1 4

35 **36.**
 3 , 3 4 4

35 **37.**
 4 , 1

30 **38.**
 1 2 , 1 (neighboring)

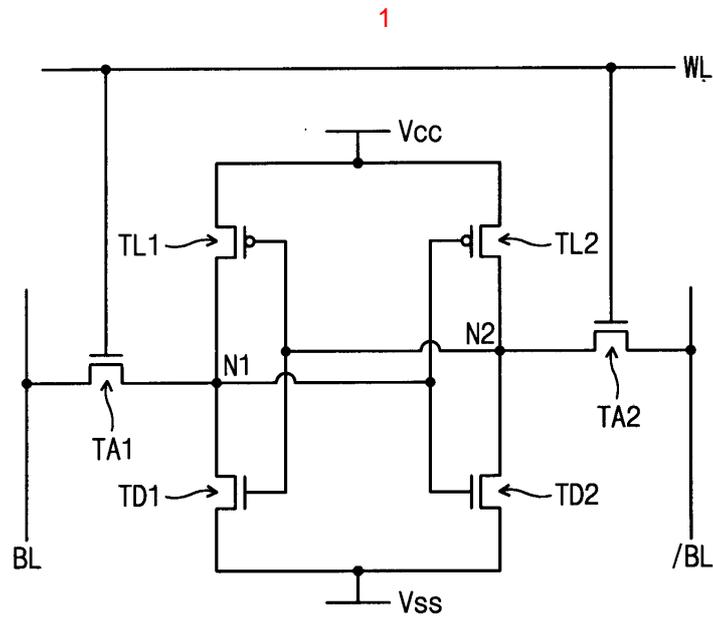
38 **39.**
 1 ,

29 **40.**
 ,

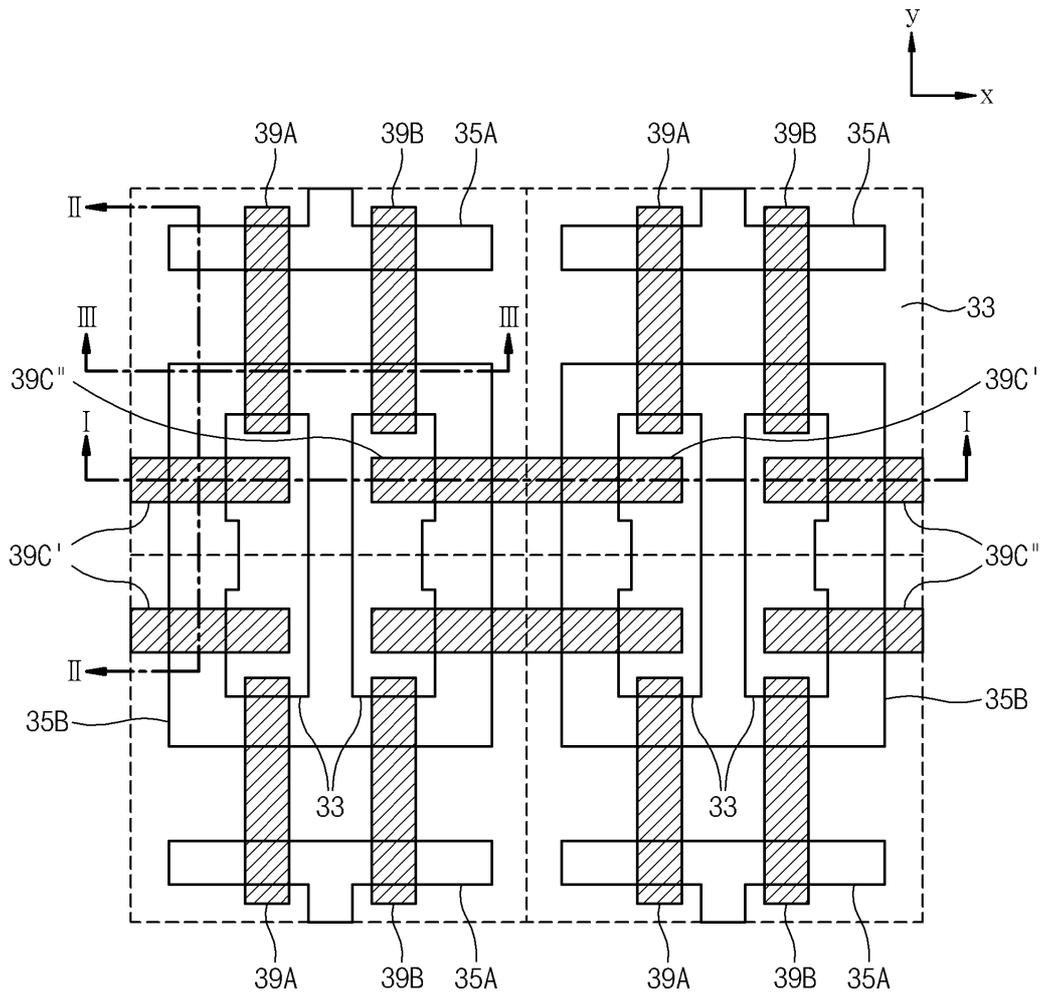
1
2

1
2

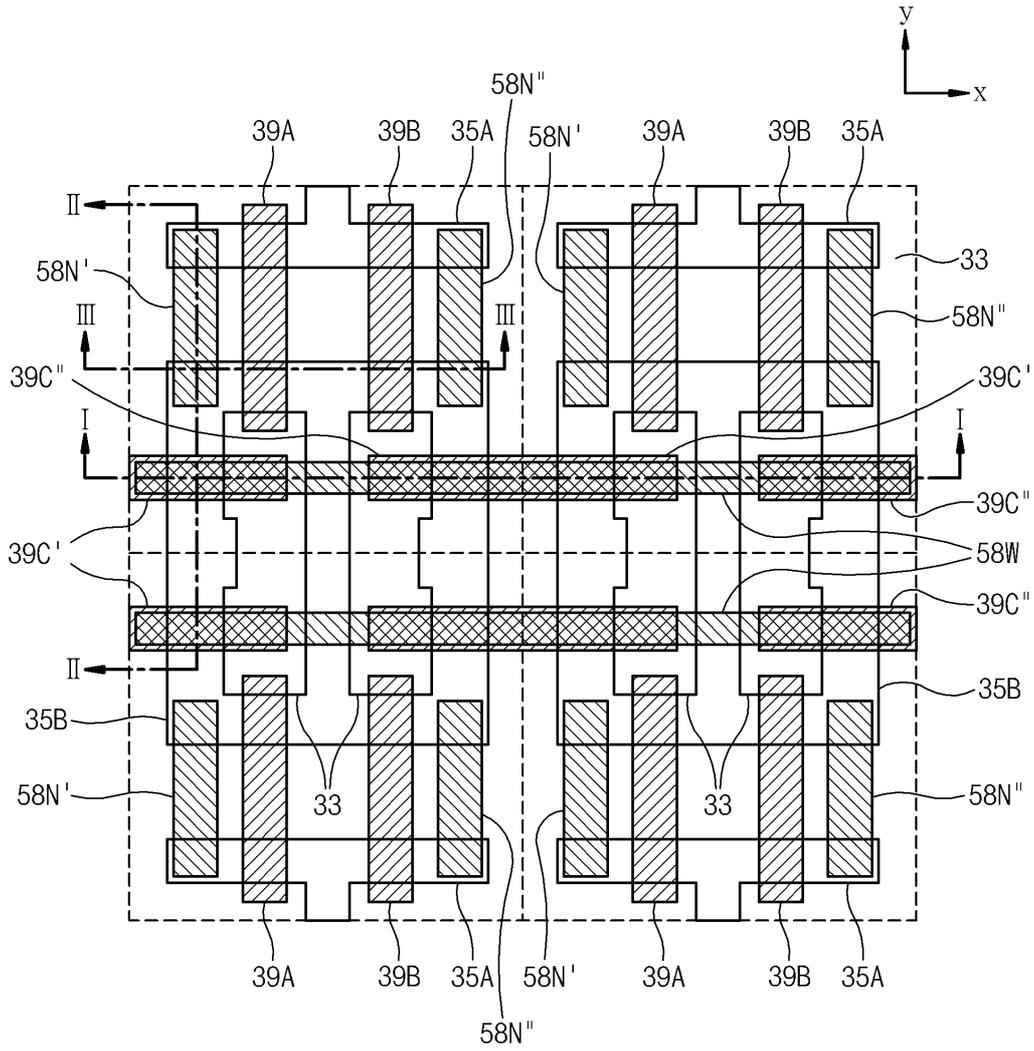
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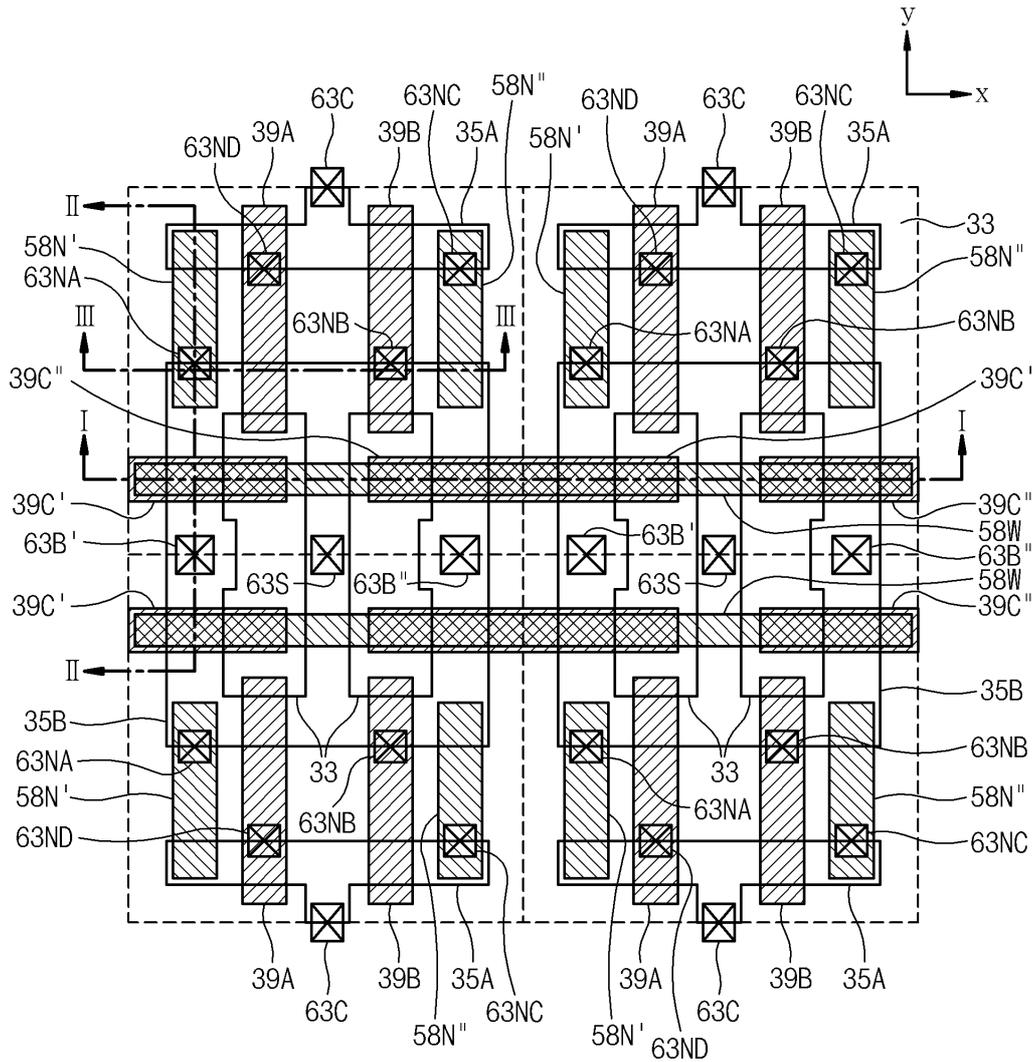


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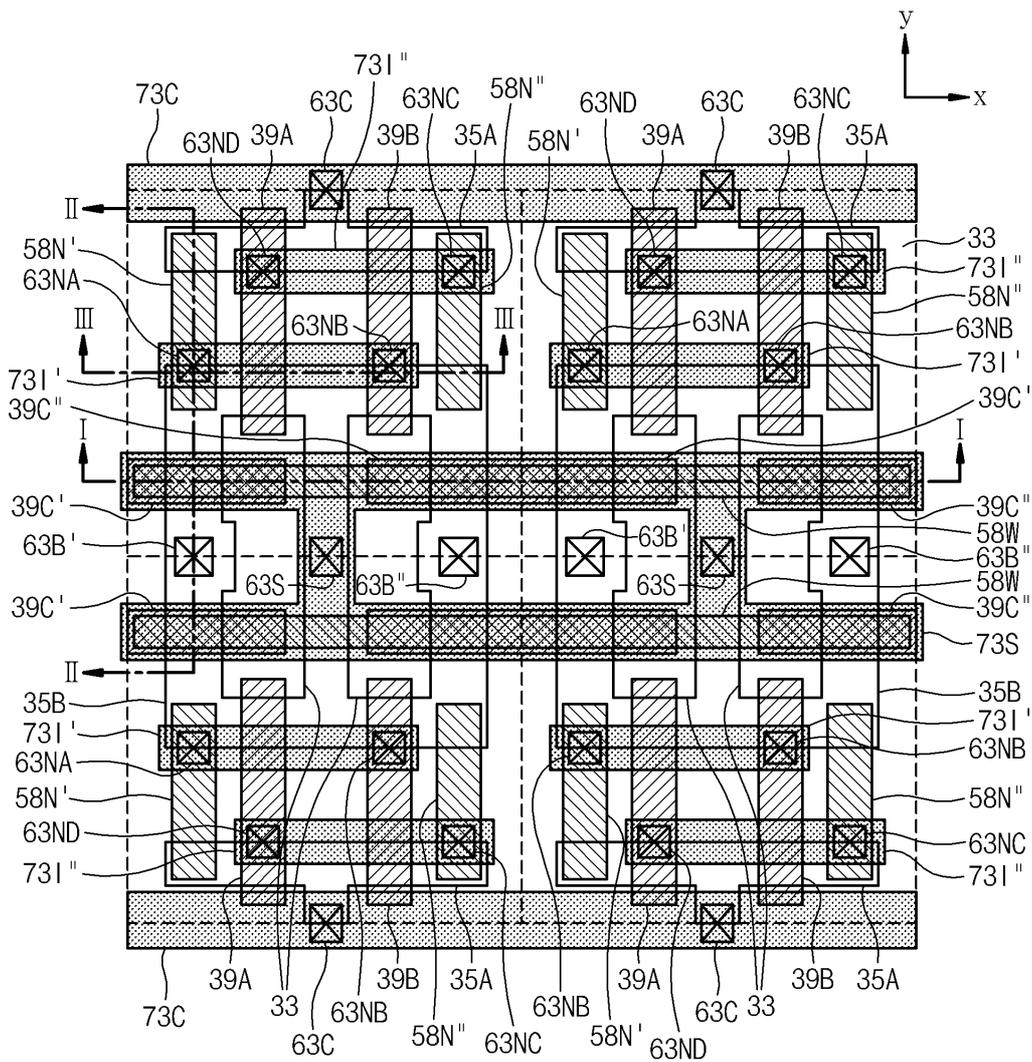


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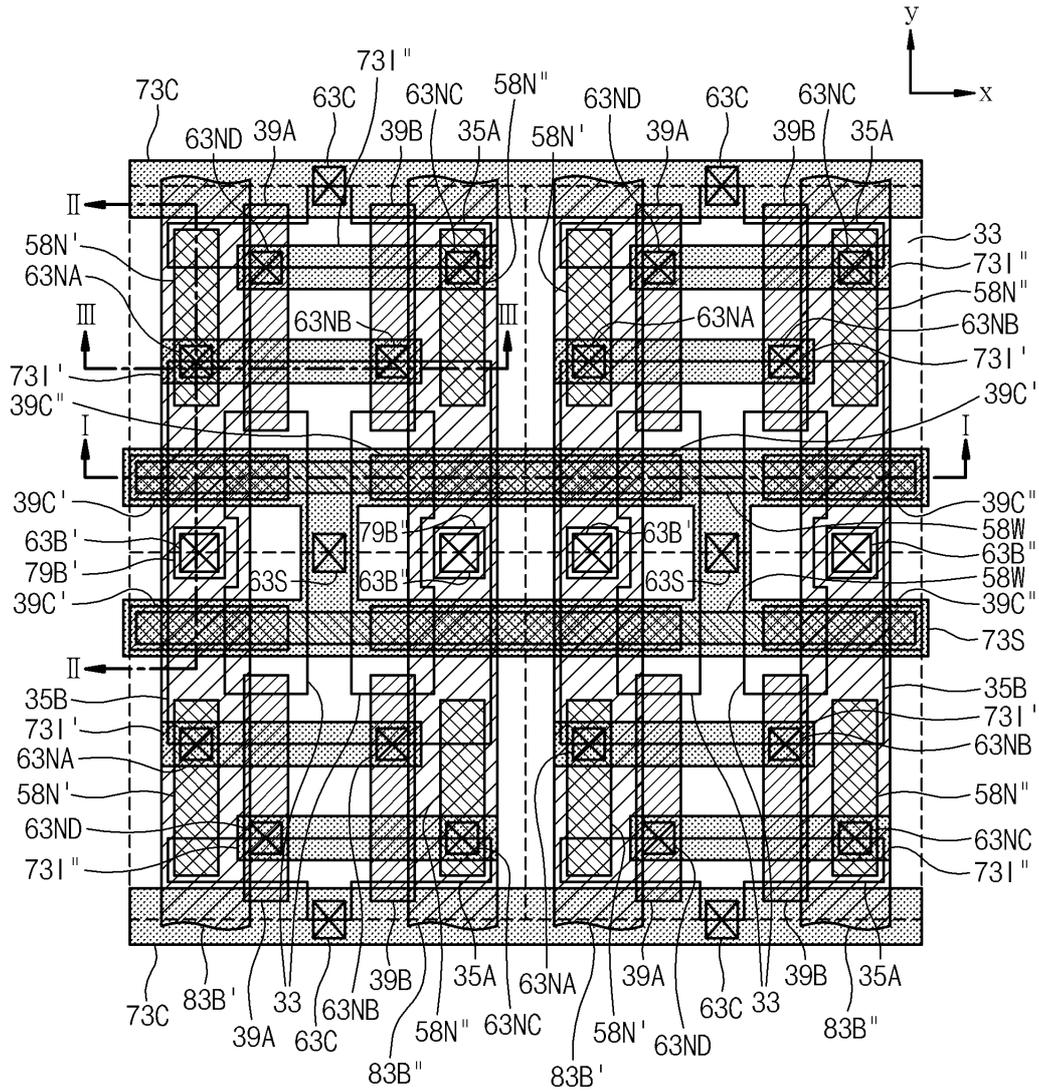




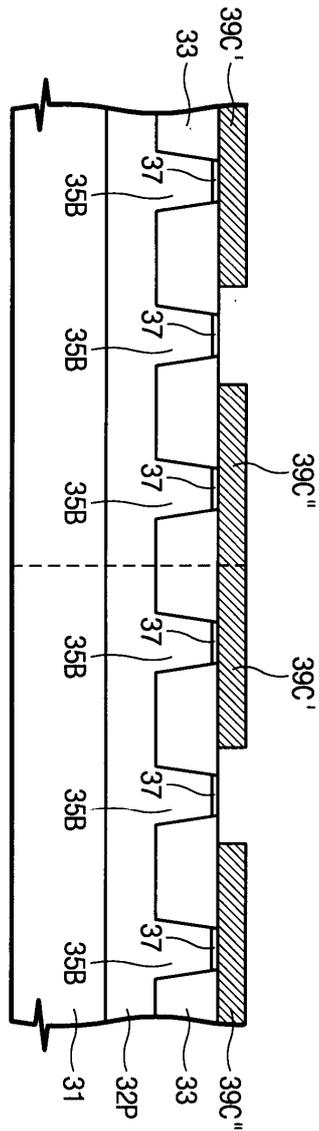
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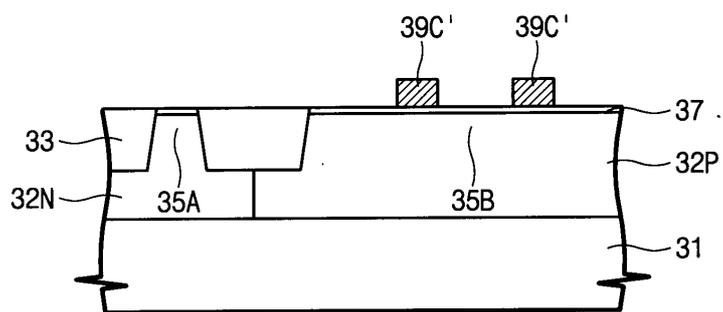
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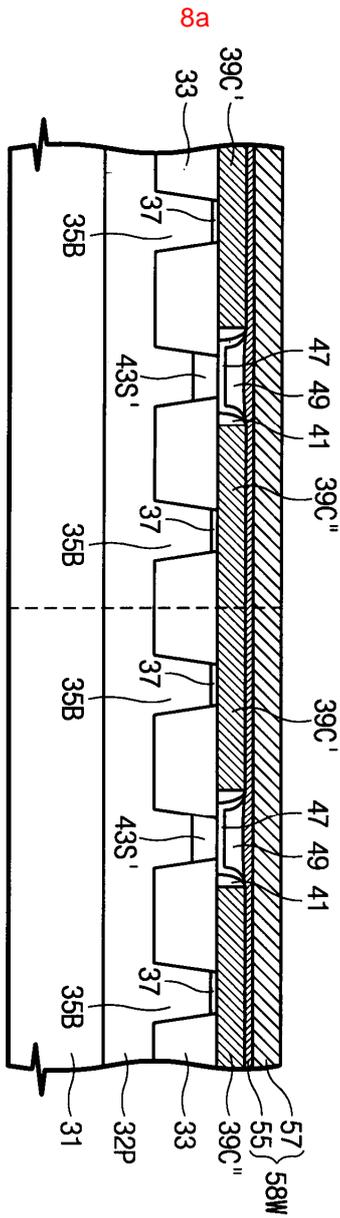
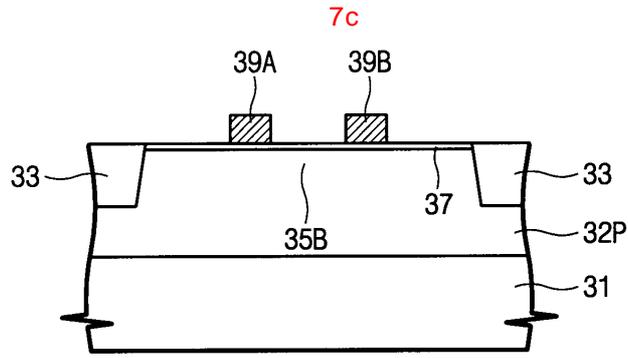


7a

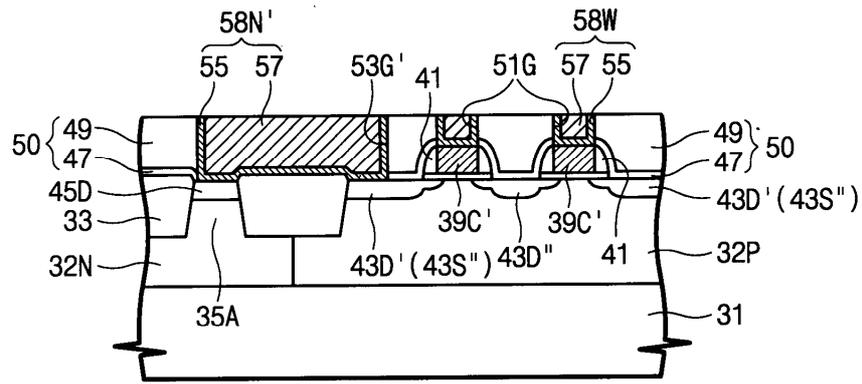


7b

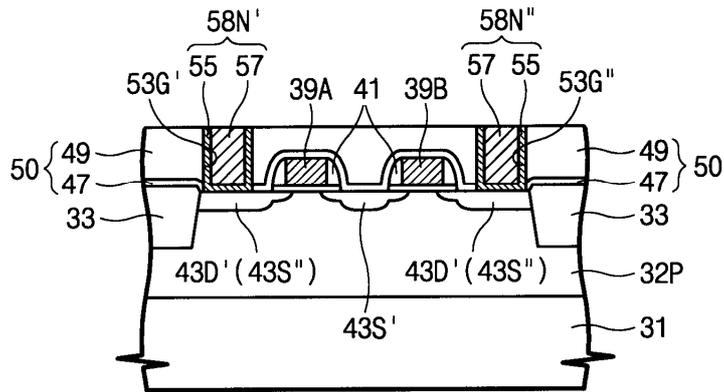


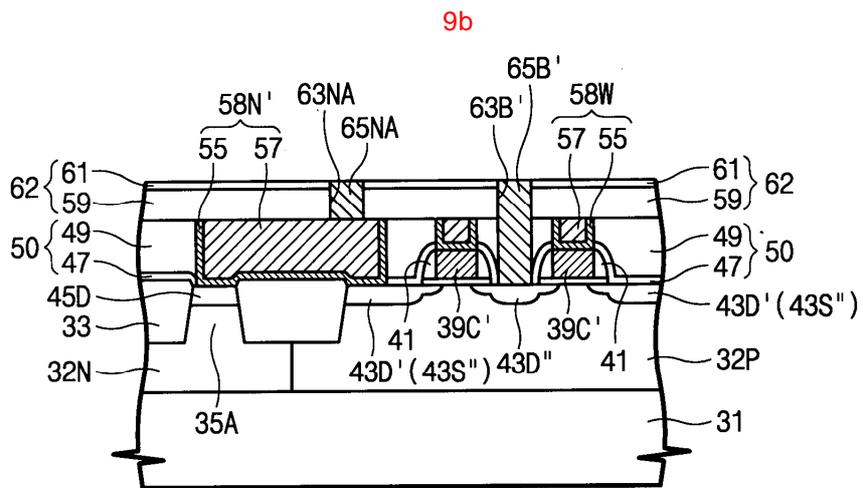
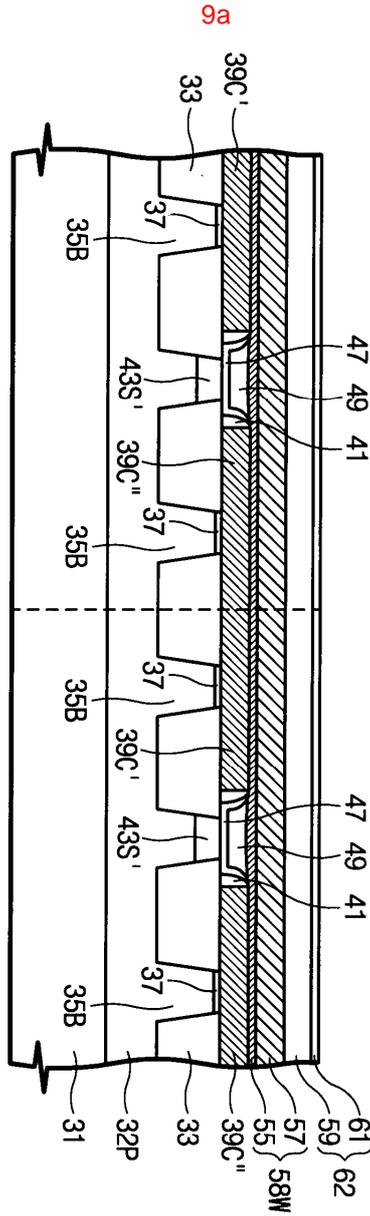


8b

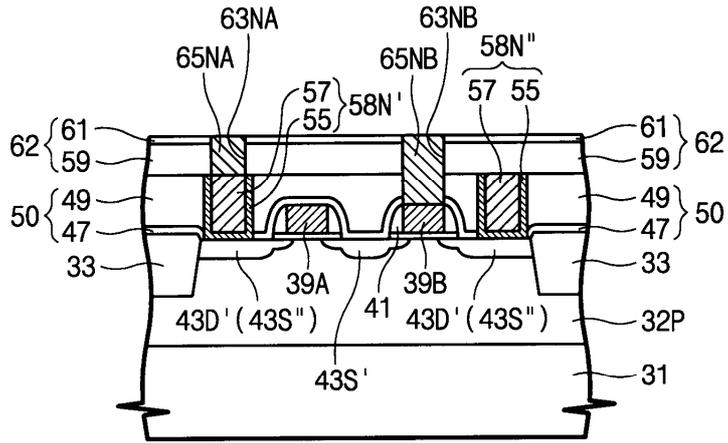


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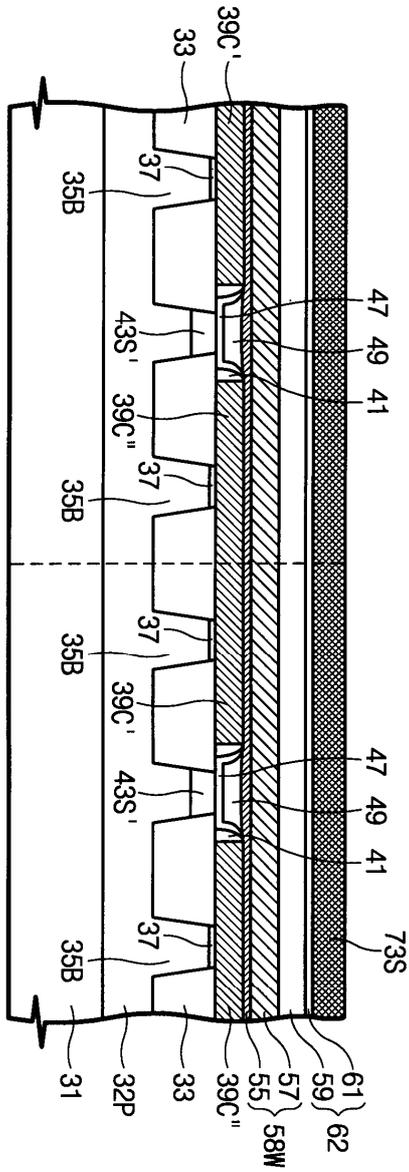




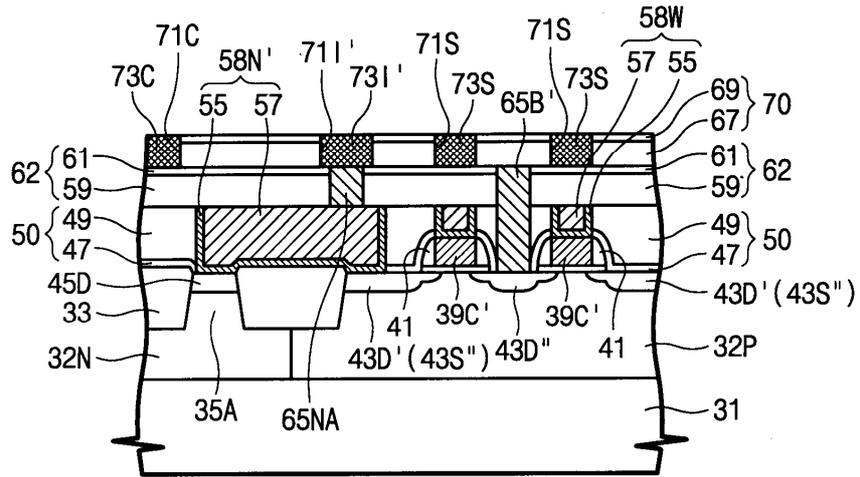
9c



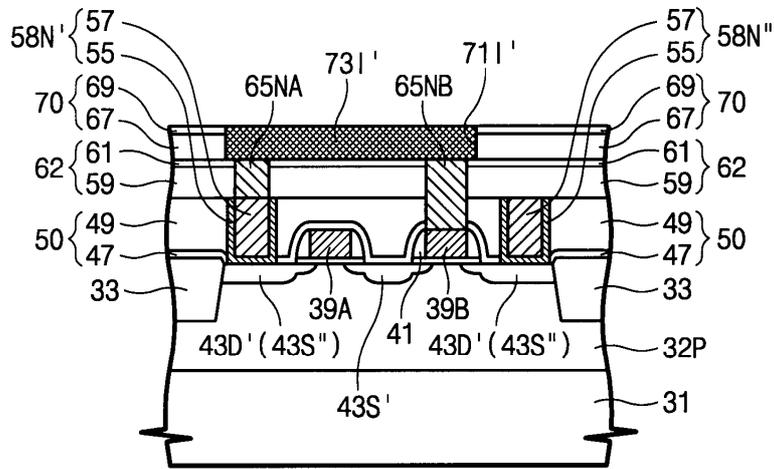
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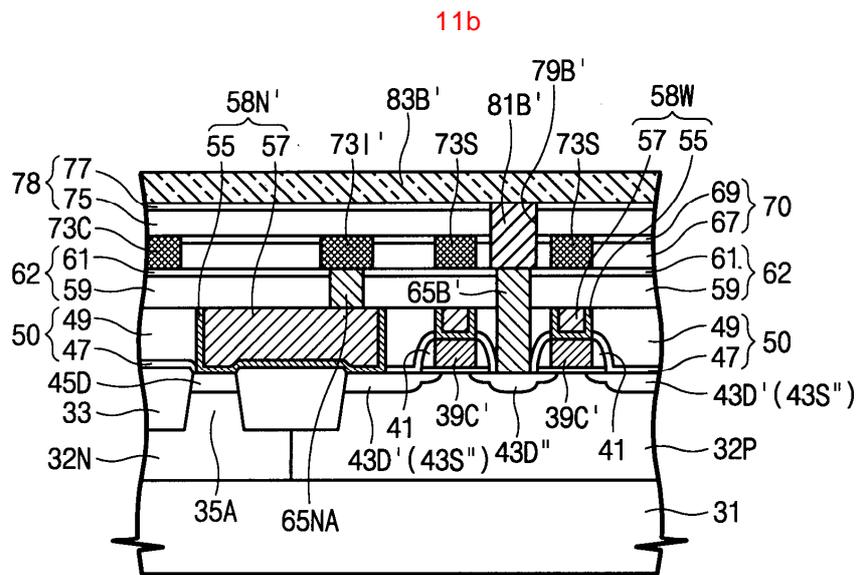
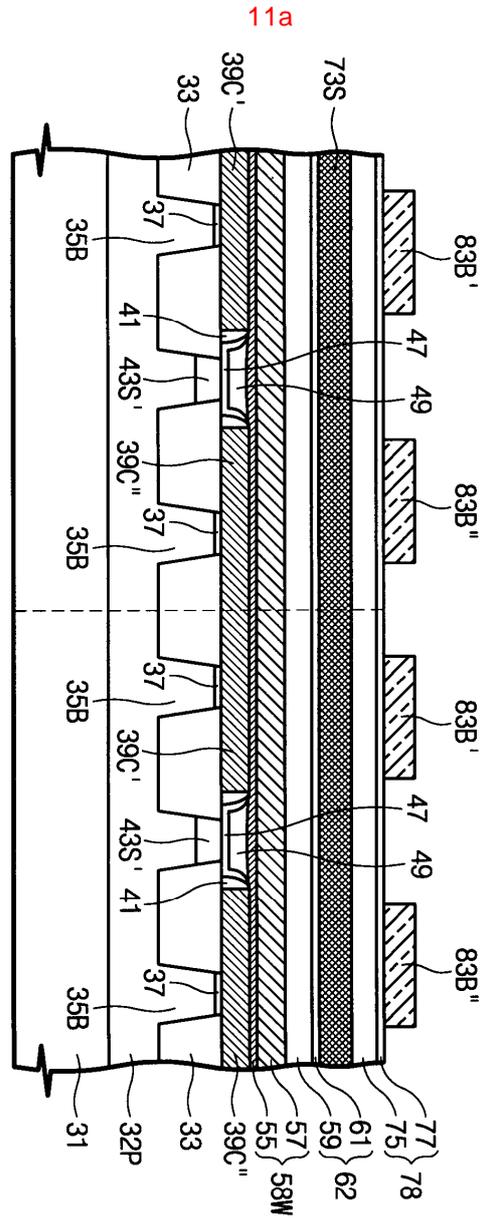


10b



10c





11c

