

(19)
(12)(KR)
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(24)2004 08 07
10-0443224
2004 07 26(21) 10-2001-0059261
(22) 2001 09 25(65)
(43)10-2002-0024796
2002 04 01(30) JP-P-2000-00291910 2000 09 26 (JP)
JP-P-2001-00272224 2001 09 07 (JP)(73) 가 가
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1 2 - 2 가 - , 2 1 -
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2 1 II-II

3a 1 IIIA-III A

3b 1 IIIB-IIIB

4 1

5 4 1

6 5 1

7 6 1

8 7 1

9 8 1

10 2

11 2

12 11 2

13 12 2

14 13 2

15 3

16 15 3

17 16 3

18 17 3

19 4

20 19 XX-XX

21 4

22 5

23 6

24 23 XXIV-XXIV

25 6

26 (a)

26 (b) 6

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29 (a)

29 (b) 6

30 (a)

30 (b) 6

31 7

32 31 XXXII-XXXII

33 8

34 33 XXXIV-XXXIV

35 8

36		9			
37	36		XXXVII - XXXVII		
38	9				
39a	9				
39b	9				
40a					
40b,	40c	10			
41a,	41b	11			
42a,	42b,	42c,	43a,	43b	
44a	12				
44b	44a		12		
45					
46a	1				
46b	1				
47a	46a	46b		XXXXVIIA - XXXXVIIA	
47b	46a			XXXXVIIIB - XXXXIIB	
48a	2				
48b	2				
49a	48a	48b		XXXXIXA - XXXXIXA	
49b	48a			XXXXIXB - XXXXIXB	

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13 : 1
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16 : 2
17 :
18 : 2

[illegible]

46a, 46b, 47a, 47b, (11) 1 (12), 1 (12)
 12) 1 (13a) 1 (13a) 1 (13a) (15)
 (15) 1 (13a) (13b) (15)
 2 (13b) 2 (13b) (13b)
 (50)가 2 (13b) (15) 2 (13b) (16)
 2 (16) (18) (11) 3 (18), 2 (19)
 6) 1, 2 (19) (20) (20) (21) 1, 2 (21)
 3 (21) 1, 2 (13a, 13b) (13a, 13b) 2
 1 1, 2 (13a) (15) 1
 , 2 (13b) (15) 1
 가
 , 47a (50)가 2 (16) Q
 가 (50) P (50) (10) (50) Q
 , (50) 가
 , (20) (15) (20)
 가 , 2 (13b) (13b) (13b)
 , (15) (15) (11) 가
 , RC
 , NAND (13b) RC 가 가 2
 , (20) RC 2 (20)
 (13b) (20) RC
 가
 48a 2
 48b 2 XXXXIXA-XXXXIXA 49b 49a 48a, 48b
 IXB XXXXIXB-XXXX 1
 49a, 49b (11) 1 (12), 1 (12)
 (13) (15) 가 (15)
 (15) (13) (13)
 2 (13) (15) 2 (16) (13) (15)
 (16) (16), 2 (18), 2 (16) (13)
 , (11) 3 (19) , 3 (19) (20)
 , 2 (20) (21) 1 Q가
 , (18) (10) 가 2 (16) (20)
) , 2 (13) 가 (18) 2 (13) (1)
 6) (18) 2 (16) 가 , 가 ,
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가 , , 48a ,
NAND , 가 ,
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1 , 1 1 , 1
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2 1 1 가 - , 2 1
- 2 2 1
- 2 , 1 , 1
1 2 , 1
1 1 1 가 - , 2 2 ,
2 1 1 3 - 3
3 ,
1 1 , 1 1 ,
- , 1 2 , 2 1
1 2 , 2 2
4 ,
1 1 , 1 1 ,
- , 1 2 2 , 2
2 , 2 2 1 3 ,
1 5 , 1 1 ,
2 - , 1 2 , 2
2 , 2 1 , 1
- 2 , 1, 2 2
1, 2 2 - 1 3
 , 1 , 2 , 2 3
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3a 1 IIIA-III A

2 1 II-II

3b 1 IIIB-III

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(17)

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(18)

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(13)

(16)

2

ONO(Oxide Nitride Oxide)

(20)

(20)

(12)

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I-II

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IIIA-III A

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(11)

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(12)

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(12)

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(12)

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(13)

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(13)

(11)

(14)

(14)

STI (Shallow Trench Isolation)

(15)

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(15)

가

(11)

ONO

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(16)

6

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(16)

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7

(22)

가

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(13)

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(16)

(17)가

(11)

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 (19) 2 (15) (11) 3 (19) 3
 (20) 2 (18) (20) . ,
 (21) .
 1 1 (13) (15) , 1
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 (18) (15) (15) 2 (18) (13) 1 (13)
 (15) 가 (13) RC . , 2
 (18) ,
 가 . ,
 , 2 (18) (18)가 , 1 (13)
 2 (18) 2 (16) 가 3 (18) 1 (13)
 3) 2 (18) 2 (16) 가 가 . ,
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 D 가 .
 , (16) (17) , L (17) , L
 (17) , (10) L ,
 (17) .
 , 1 가 , NAND .
 [2]
 2 , 2
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 10 2 . 1
 0 1 II-II 가 2 3 (18a, 18b) 2 , 2
 11 14 2 . 11 14 1
 IIIA-III A . , 2 가 ,
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 , 5 , 1 가 , 1 (13) 2 (16)
 , 11 , (17) , 2 (16) 2 (18a) .
 , 12 , (10) 2
 (18a) 2 (16) . , 1 (13) 가 , (17)가 .
 , 13 (11) 3 (18b) . ,
 (17) , 2 3 (18a, 18b) 1 (13)
 , 14 , 3 (18b), 2 (18a), 2 (16) 1 (13)
 가 . 1 가 , 2 가 가 .
 2 , 1 가 , , 가
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 1 (17) (6) , (22)가 (2)
 16) , 2 (16) 2 가 . , 2 (16)
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 , 2 (17) 2 (16) 2 (18a)
 , 2 (18a) , 2
 (16)
 [3]
 3 1 , NAN
 D 0.2 μ m 가 ,

, 3 , 0.1 μm , 3
 15 18 3 가 15 18 1
 IIIA-III A , 3
 , 1 2 가 ,
 , 11 , 2 가 , 2 (16) 2 (18a)
 , 15 , CVD(Chemical Vapor Deposition) , 2 (18a)
 (10) 2 (18a) (22) , 1 (22)
 1 (22) 2 (18a) , 2 16 (23)
 , 1 (22) 2 (18a) 2 (23)
 2 (23)
 , 17 , 1, 2 (22, 23) , 2 (18a) 2 (16)
 , 18 (10) (17)가 , 1, 2 (22, 23)
 , 1 (17) , 2 (18a) 1 (13) 3 (18b)
 , 1 가 , 3 가 (18a, 18b)
 3 가 , 1 2 가
 , 2 (18a) 2 (16) (17)
 3 (18a, 18b) (17) , 1 1 (13) 2
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 , 3 가 , 가
 (17) 3 (17)
 , (17)
 (17) , (17) (17)
 [4]
 1 3 ,
 4 가 ,
 19 4 20 19 XX-XX
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 19, 20 , (11) , (11)
 (10) , (15) , (10) 1 (12) (15)
 2 1 (13) , 1 (13) (17) 2 (16) ,
 (13) 2 (16) (17) 2 (18) , (17) 1
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 21 , 4 (20) (15) 2 (18)
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 (15) , 2 (18)
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 , 4 1 (13) (10) 2 (18)
 , 가 , RC
 , 가 , 1 2 (10) (17)
 가 , 가 가 , 가
 [5]
 5 4 5 2
 22 5
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가 . , 2 (16) (17) 가 . , 가
 , 22 3 , , 1 (17) 2 (18) 2 가 (16)
 , 5 , (15) , (10) 1 (12) (11) , (11) (10)
 1 (13) , 1 (13) (15) 2 (18) .
 5 5 , 4 가 가 . ,
 , 5 가 가 , 가 . , 가
 , 가 가 . , 가 , 가
 , , 3 , (17) 가
 가 .
 [6 6] 2 ,
 23 6 . 24 23 XXIV-XXI
 V . 25 6
 , 6 ,
 23, 24, 25 가 .
 (10) , (15) , (10) 1 (12) (11) , (11)
 1 (13) , 1 (13) (15) , 1 (15)
 (17) 2 (16) , 2 (16) (17) 2 (13)
 (18) , 2 (16) (17) (18) (20)
 . 6 , (17) 1 (13) 2 (18) .
 가 4 가 가 ,
 , (20) , (Ti/TiN) Al-Cu (20)
 (16) , Ti 2 (18) Si가 TiSi , 2
 1 (12) TiSi 가 (20) 2 (18) 1 (12) (10)
 , 6 , 1, 2 (13, 18) 2 (16) (16) , 2 (1
 6) , 2 (16) ,
 , 6 , 2 (16) , (10) (20)
 , (10) , (20) 6 (26 (b)) (15)
 (20) (26 (a)) , (15)
 , 6 , (15)
 , NAND 가 . , 27 (15) (15)
 (11') , 28 (15) (11)
 , 29 (a), 30 (a) , (15)
 , (21) , (15) (20) (20)
 1, 2 (13, 18) (16) (15) , 6 (20)
 , 6 2 3 가 2 (18a) 3
 (18b) 2 가 .
 [7]

7
 31 7 , . 32 31 XXXII-XXXII
 , 7
 31, 32 , 1 (13) 2
 (16) (16) 2 (18a) 1 (13) (17) (17)
 2 (16) 3 (18b) , 3 (18b) 4 (18c) .
 1 4 (13, 18a, 18b, 18c) , (17)
 c
 7 , 4 가
 , 7 (17) c , (17) 3
 (18b) , 3 (18b) , 7
 3 (18b)
 , (17) c , (17) , 가
 , , 7 (17) c
 [8]
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 33 8 . 34 33 XXXIV-XXXIV
 , 8
 33, 34 , 1 (13) 2 (16)
 2 (18a) 1 (13) (17) (17)
 2 (16) 3 (18b) , 3 (18b) 4 (18c) .
 (17) c
 8 , (17) c가 , 7 가
 , (17) , 1 (13) 3 (18b)
 , , 1 (13) 3 (18b) 2 (17)
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 (17) ,
 [9]
 9 8
 36 9 . 37 36 XXXVII-XXXVII
 , 9
 36, 37 , 1 (13) 2 (16)
 2 (18a) 1 (13) (17) (17)
 2 (16) 3 (18b) , 3 (18b) 4 (18c) .
 (17) c , (17) d
 9 , (17) , (17) c , 7, 8
 가
 (17) (17) d가 , 38
 (17) (17)가 ,
 (22') 가
 , 9 NAND 가
 NAND 39a, 39b ,
 , 가
 (17) e1 , (17) e2
 , 38 (22') 가
 , (17) e1, e2 (17) e1
 e1 (17) e2
 [10]
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 40a 4 . 40b, 40c 10
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4 40a (17) (10) (10) (10)
 , 10 40b (17) (10) (10)
 , 40c (15) (17)
 f
 10 f 4 가
 , (17) (10) (15)
 f가 , (17) 가

[11]
 11
 41a, 41b 11
 41a, 41b , 1 (13) 2
 (16) 2 (18a) 1 (13) (17) (17)
 2 (16) 3 (18b) (17) c
 , , 3 (18b) (17) c 1/2 가 (17)
 c 3 , 가
 11 , 4 가
 , 11 (17) c , 3 (18b) c/2
 , (17)가 3 (18b) , 3 (18b)
 , (17) c , 3 (18b)
 , 가 , () , 41b S
 가 , 3 (19)

11
 1 , 42a (17) , 3 (18b) a 2
 , (17) 3 (18b) (17) 3 (18b) 가
 2 , 42b , 3 (18b) 4 (WSi)(18c)
 4 (18c) (22')가 , 가
 (22') (22') , 3 (18b) 가
 , 가

3 42c , 3 (18b) 4 (18c) , 3
 (18b) , (17) 3 (18b) (3)
 0) 가
 4 , 43a , 가 3 (18b)
 (17) , 가 (17)
 , 3 (18b) 1/2 가 , 3
 (18b) 가 , 가
 5 , 4 , 3 (18b) 가 , 43b
 , S가 , (31)가
 () (10) (19)

[12]
 12 11
 44a, 44b 12
 44a , 11 가 , (17) c , 3 (18b)
 c 1/2 , 44b , 3 (18b) CDE(Che
 mical Dry Etching) CMP(Chemical Mechanical Polish)
 12 , 11 가
 , 3 (18b) CDE CMP , 3 (18b) , 3
 (18b) , 11
 3 (19)

, 1 12 , 1 (13) , 가
가 . , 45 , 1 (13a, 13b) 2 , 가
, 2 (10) , 1 12 , 1 (13) (13)
(15) (10) , 45 , 1 .
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가
가 .

(57)

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1 1 1 ;
1 1 1 ;
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2 1 , 1
2 2 , 1
1 , 2 , (長方向) 1 ,
, 1 2 , 2 1 ,
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1 1 1 ;
1 1 1 ;
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1 2 - 2 1
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2 2 3 - 3
2 1 1 -
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1 , NAND .
4.
2 , NAND
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1 1 1 ;
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1 2 ;
2 2 , 1

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- 1 **18.**
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 가 ,
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- 2 **19.**
1, 2, 3 ,
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- 18 **20.**
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- 19 **21.**
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- 18 **22.**
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- 19 **23.**
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- 1 **24.**
1 2 ,
 NAND , 1 2
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 2 2 ,
 2 1 ,
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- 2 **25.**
1, 2 , 1, 2 3 ,
 1, 2 3 ,
 2 2 ,
 2 1 ,
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- 24 **26.**
2 , 1 ,
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- 25 **27.**
2 , 1 ,
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- 2 **28.**
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- 2 **29.**
1, 2, 3 ,
 가 ,
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- 1 **30.**
2 ,
 1/2 ,
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- 1 **31.**

2 3 , 1/2 .

32.

1 2 1 ,

33.

2 2, 3 1 ,

34.

1 2 ,

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2 2 ,

36.

1 1, 2 , 2

37.

2 1, 2, 3 , 2

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NAND ,

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1 , 1 1

2 , 1 1

2 , 1 2

1 2 , 1 2

1 2 , 1 ,

1 2 , 2

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 1 2 , 1 ,
 1 2 , 2

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

41.

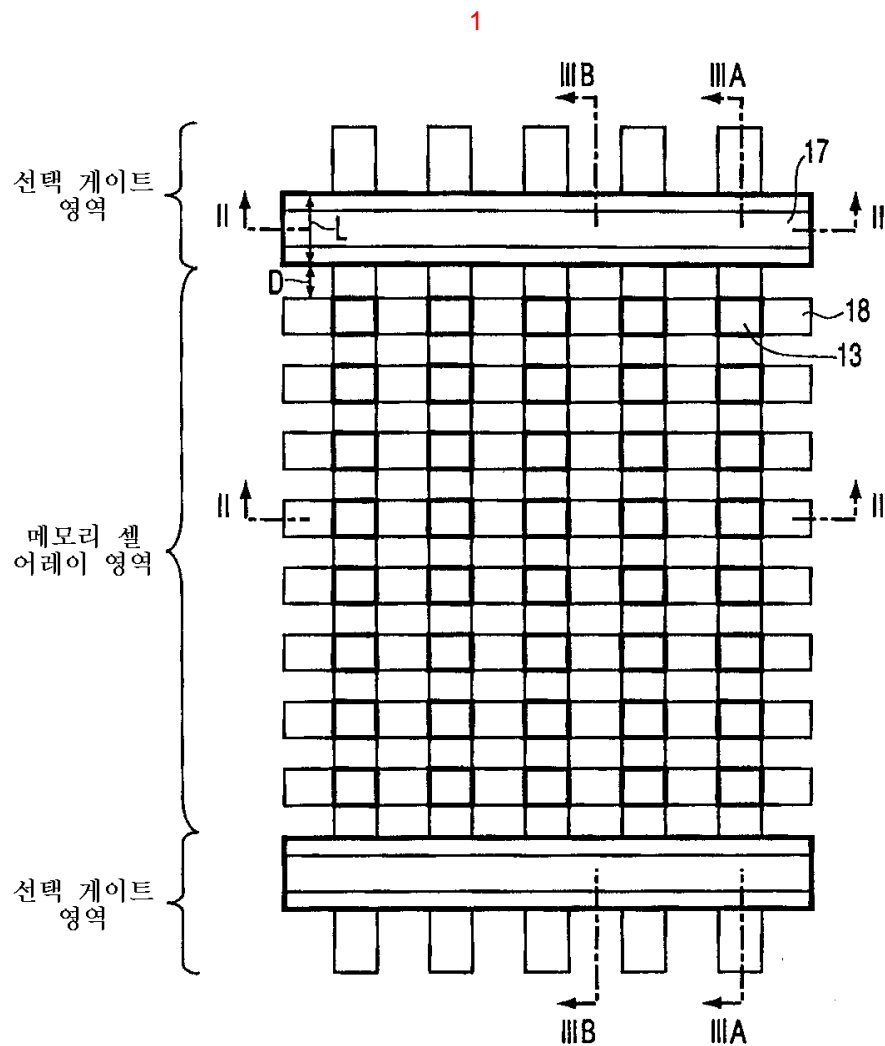
1 1 ;
 1 1 ;
 1 - ;
 2 2 2 ;
 2 2 1 ;
 ; 2 1 3 ;
 1 , 2 , 2 3 ,

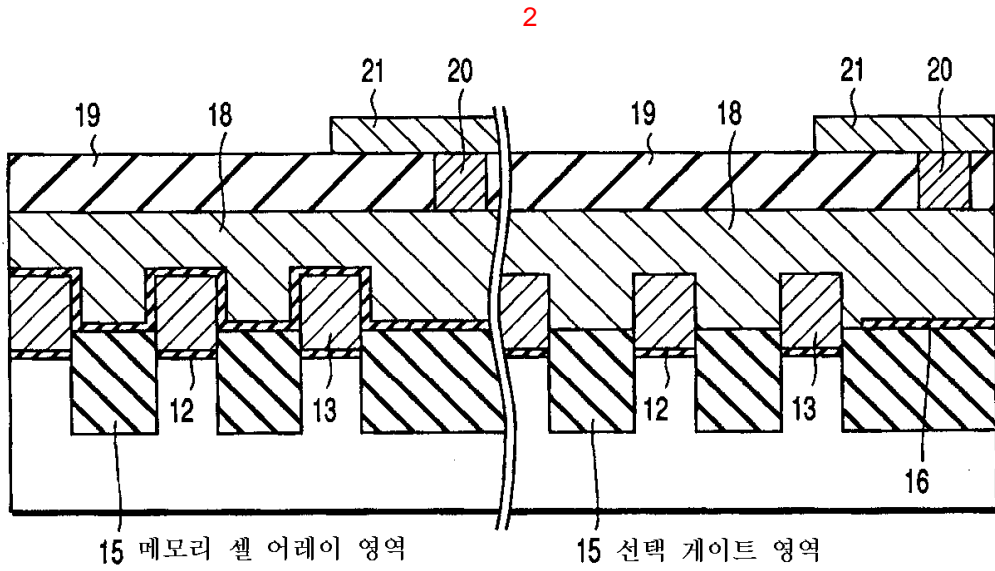
42.

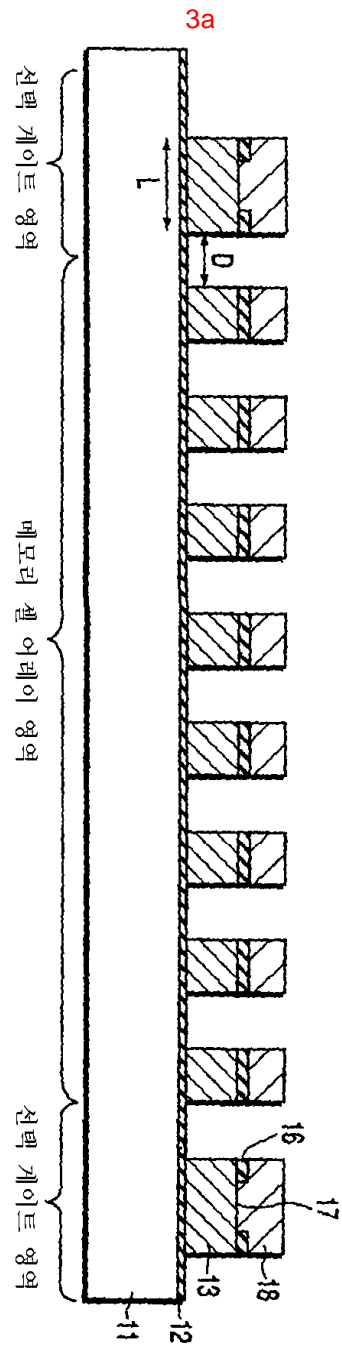
1 1 ;
 1 1 ;
 1 - ;
 2 2 1 2 ;
 2 2 1 ;
 1 - 2
 - ;

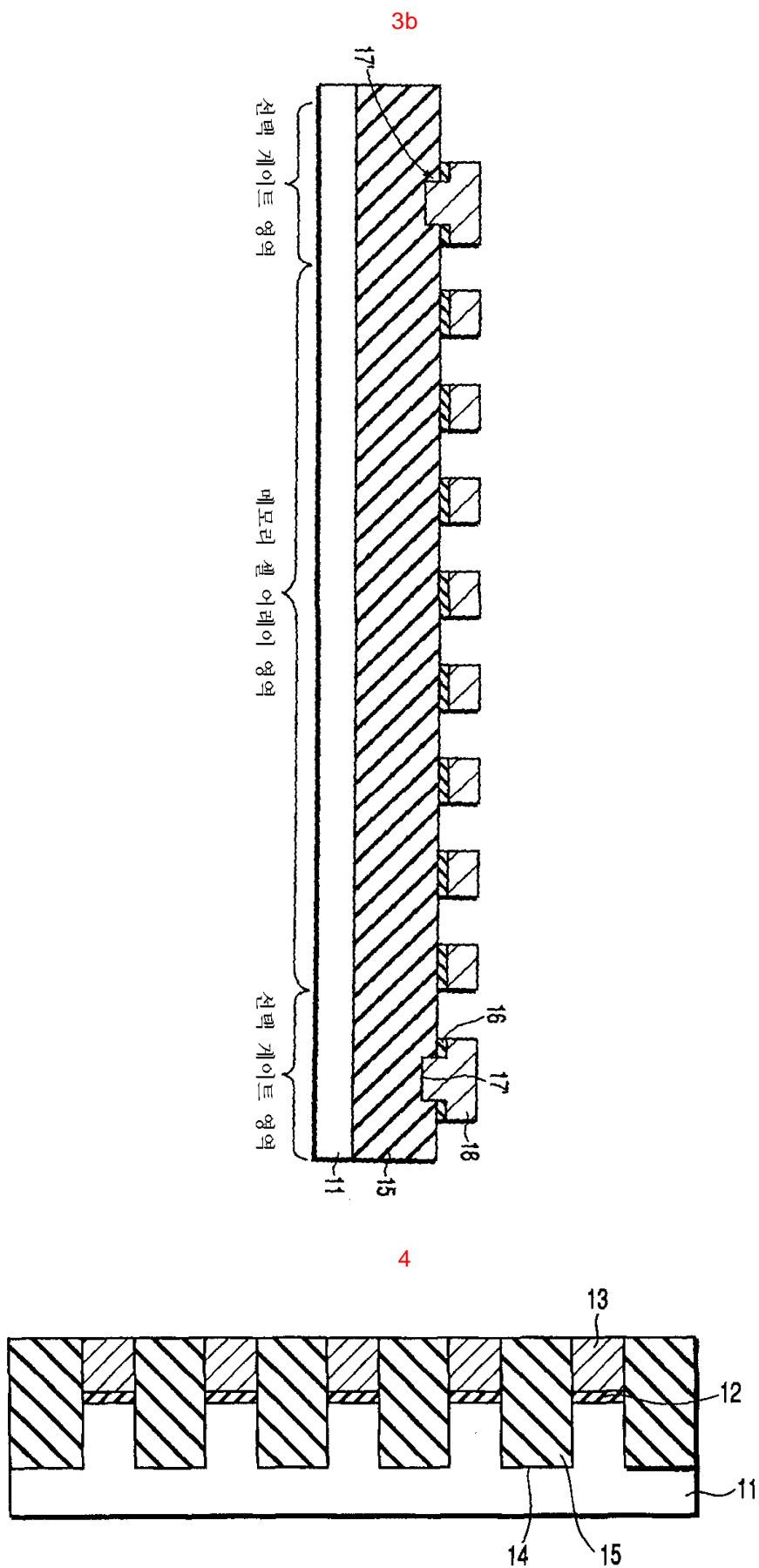
2 ;
1, 2 2 2 -
1, 2 1 - ;
1, 2 ;
2 1 3 ;
1 , 2 , 2 3 ,
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43.
40 , 2
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44.
41 , 2
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45.
42 , 2
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46.
40 , ,
1 , .
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41 , ,
1 , .
48.
42 , ,
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40 , 2 .
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41 , 3 .
51.
42 , 3 .
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40 , 2 .
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41 , 2 .
54.
42 , 2 .
55.

40	,	2		1/2
56.				
41	,	3		1/2
57.				
42	,	3		1/2
58.				
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59.				
41	,	3	,	3
60.				
42	,	3	,	3
61.				
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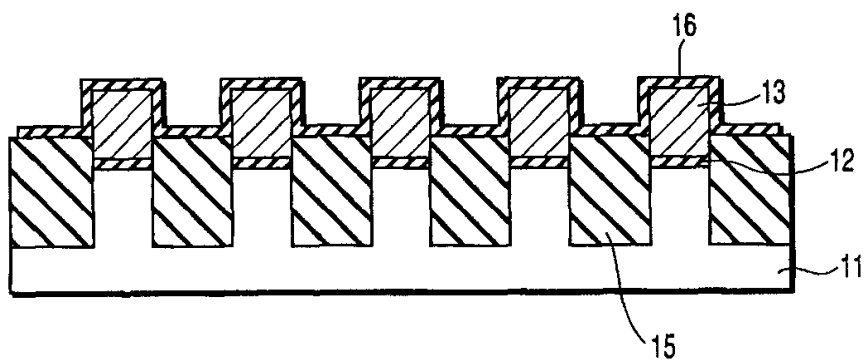




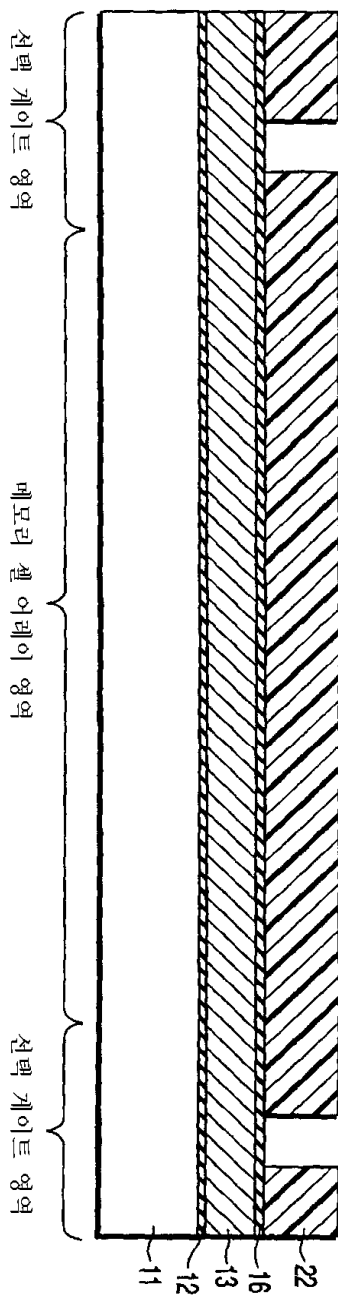


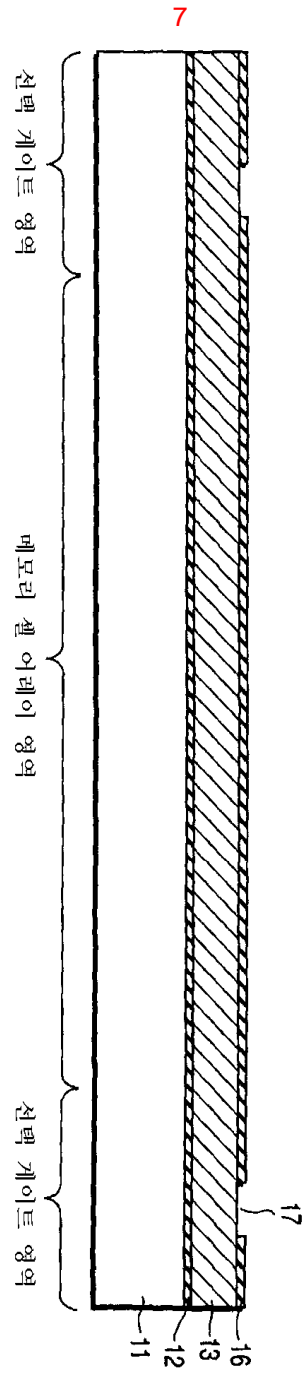


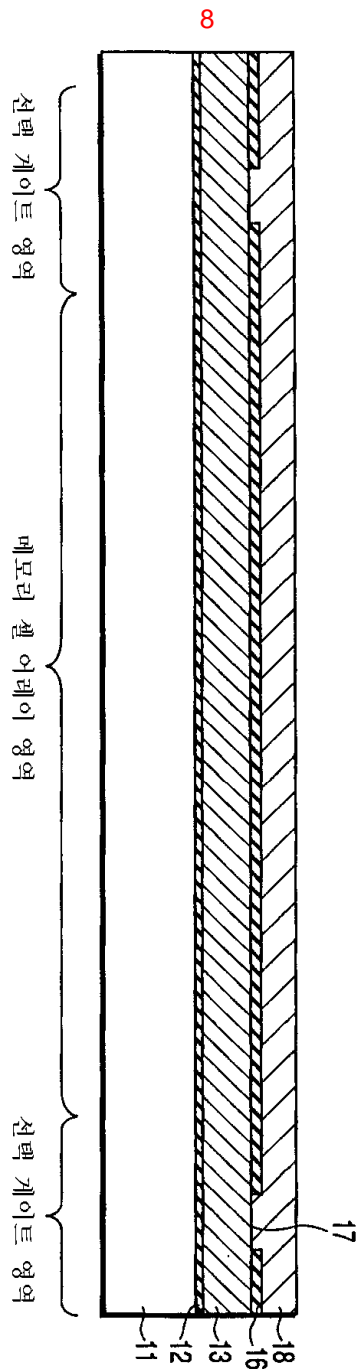
5



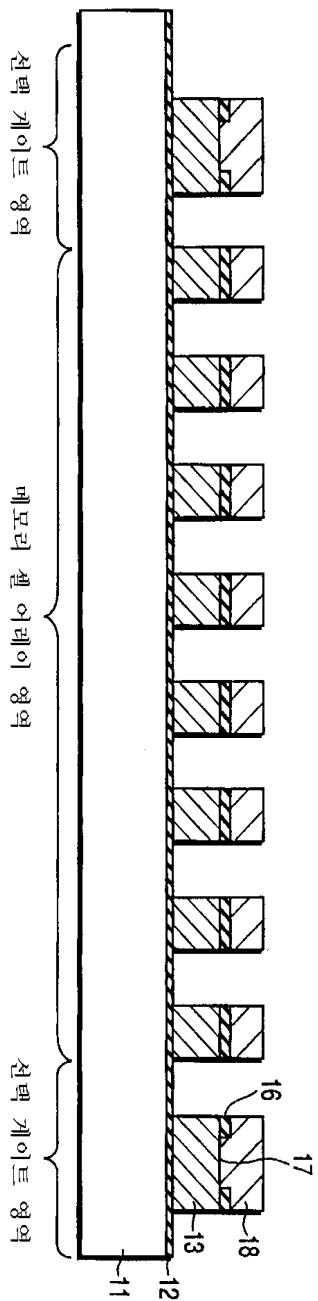
6

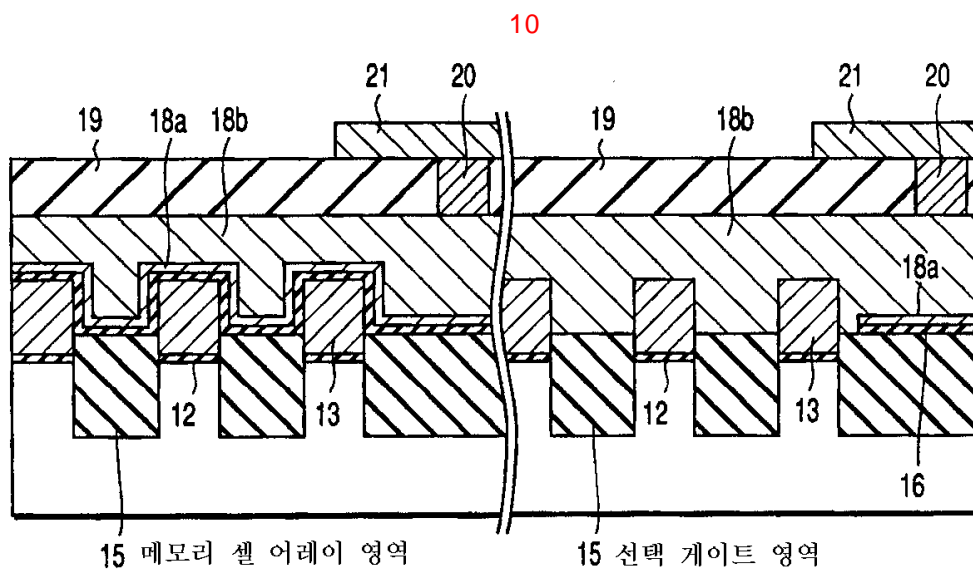


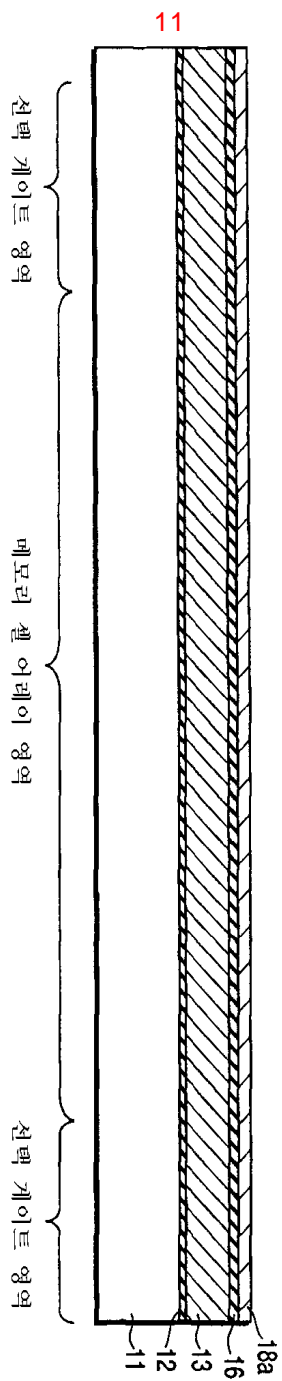


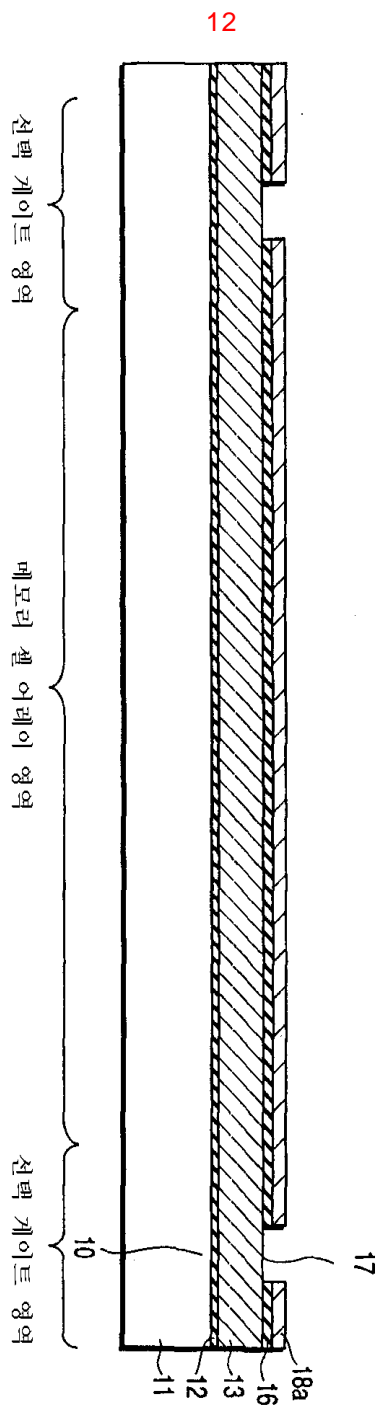


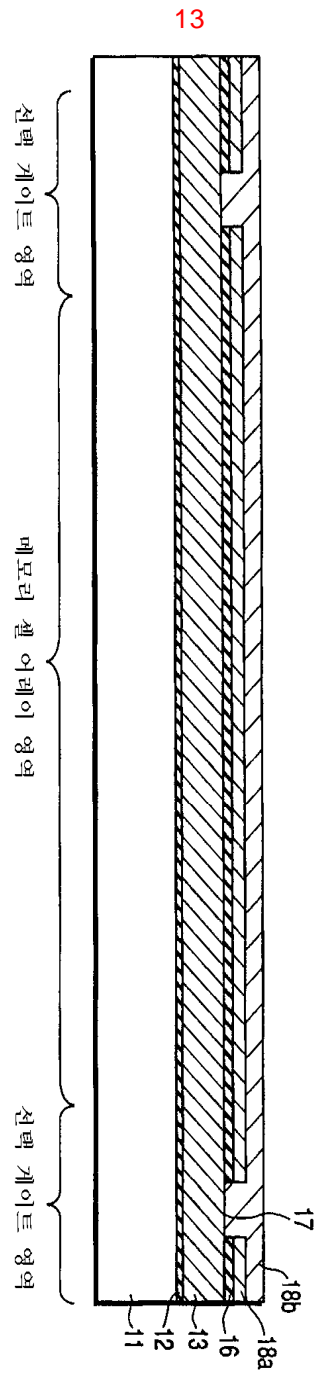
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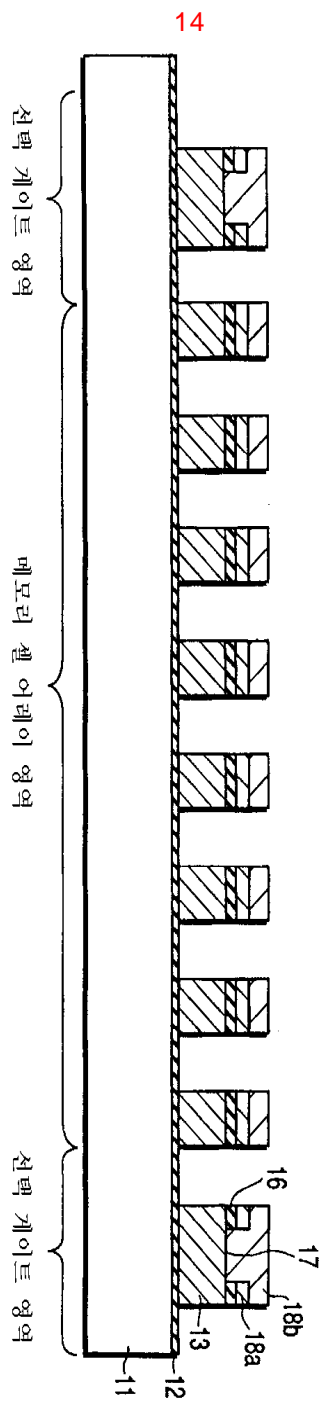


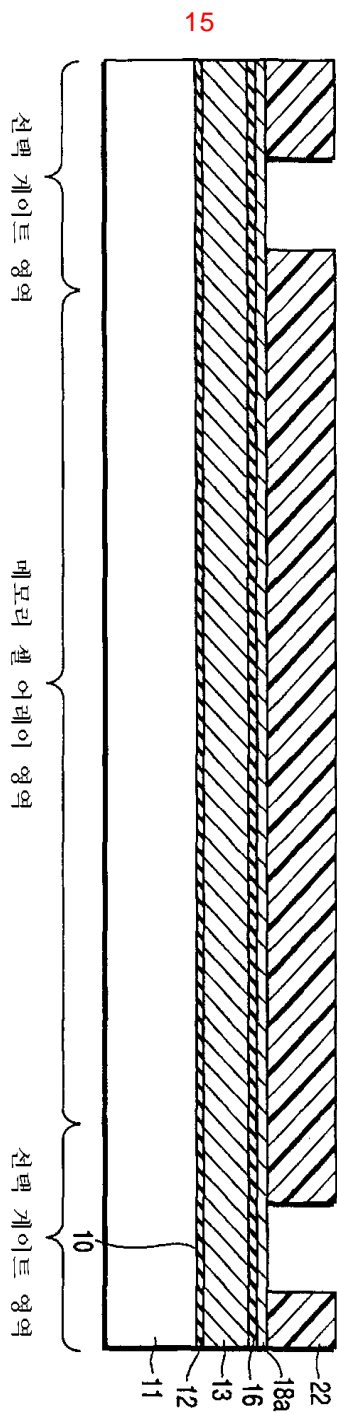


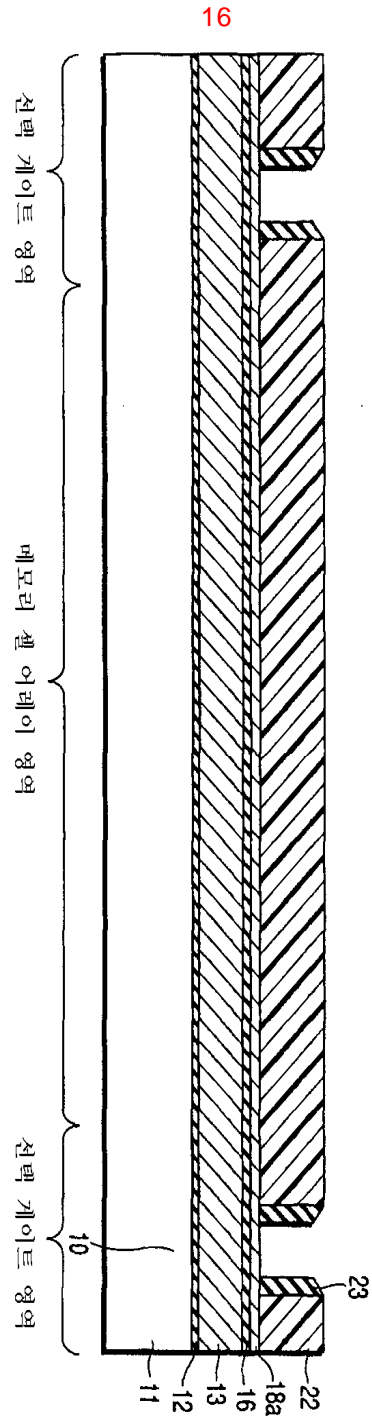


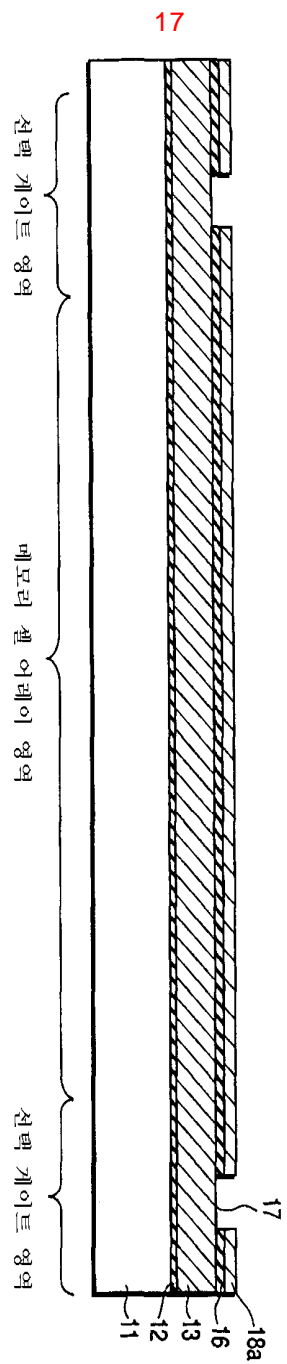


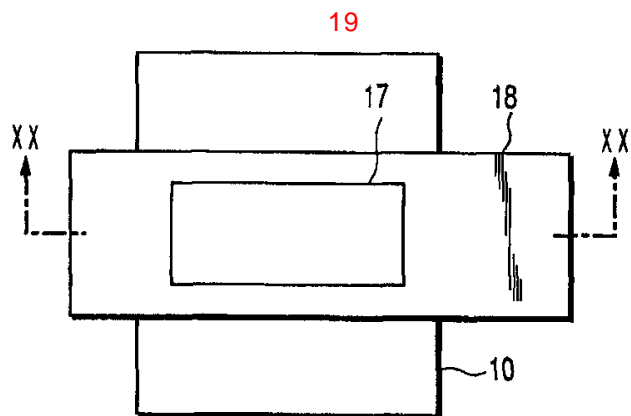
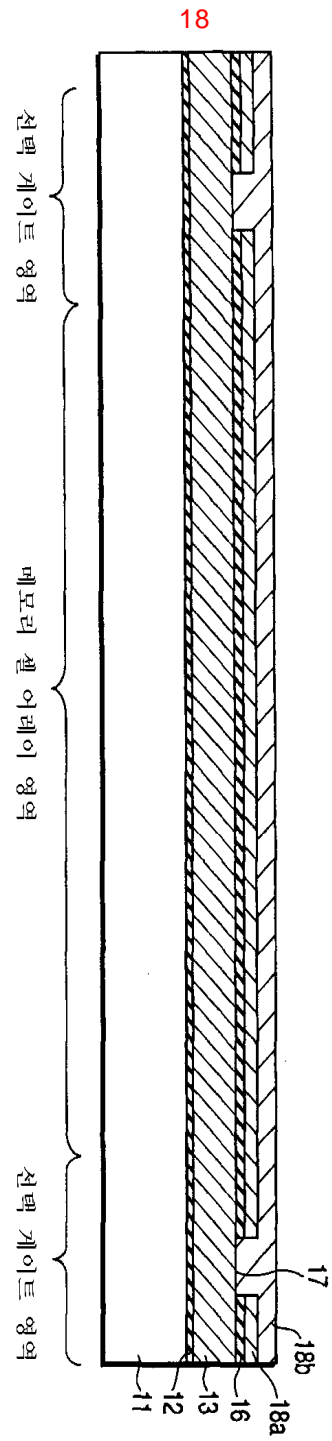


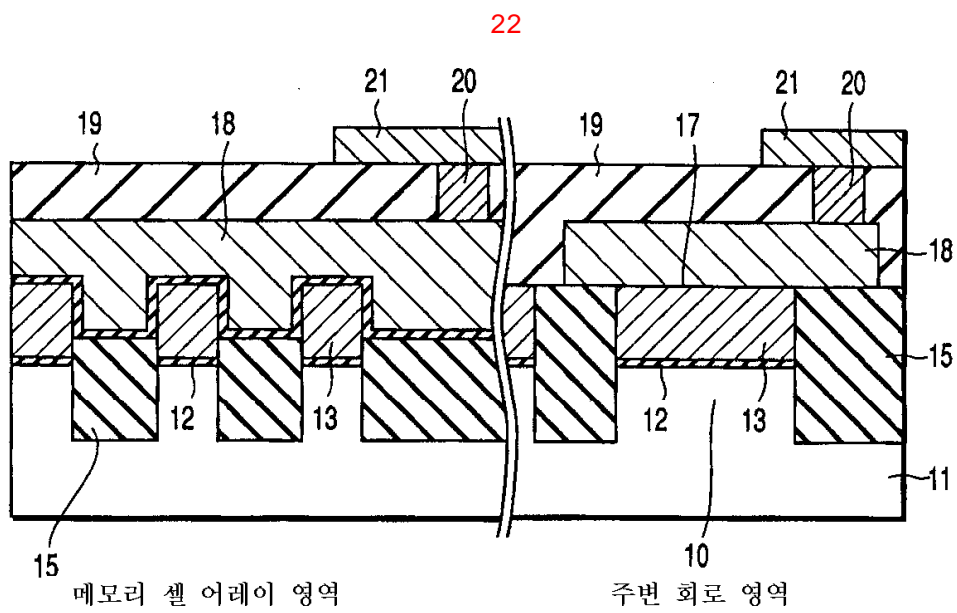
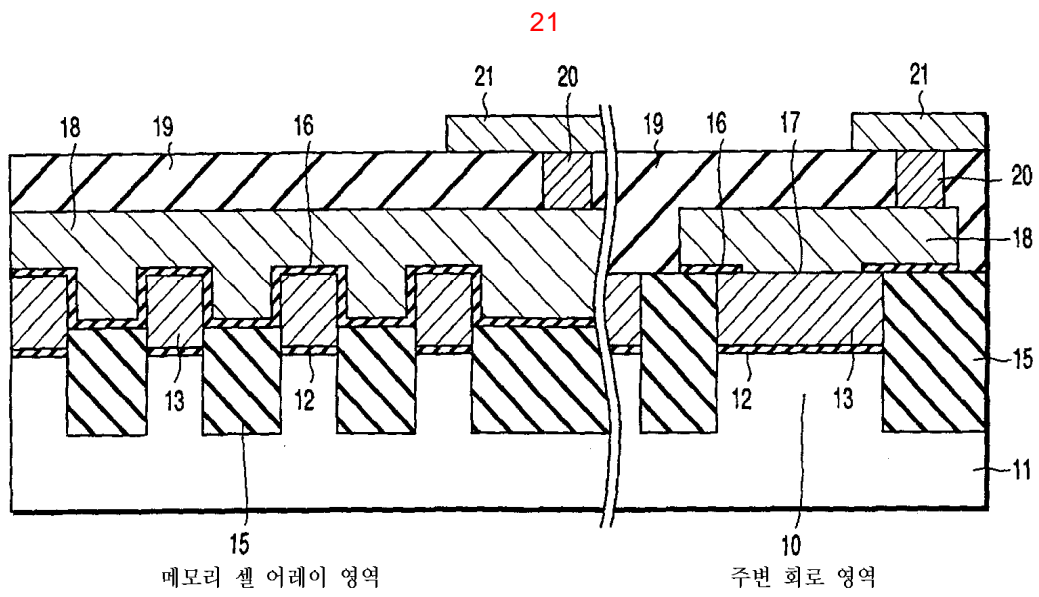
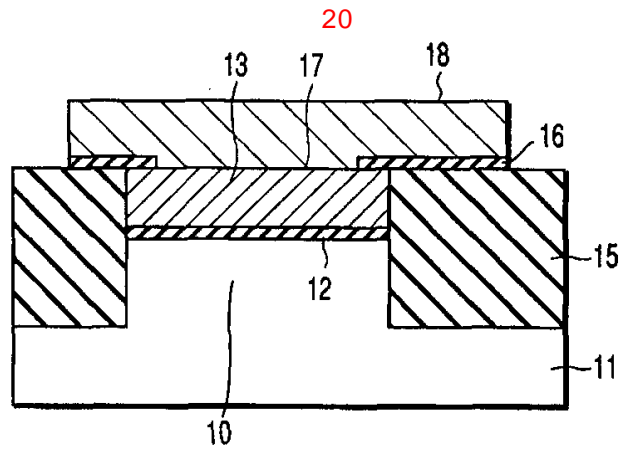




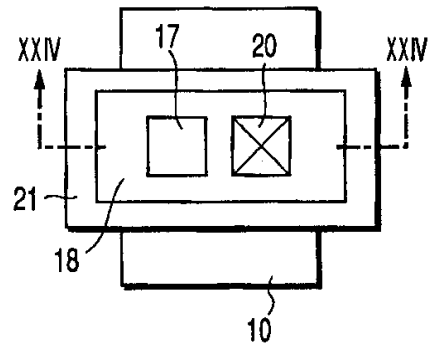




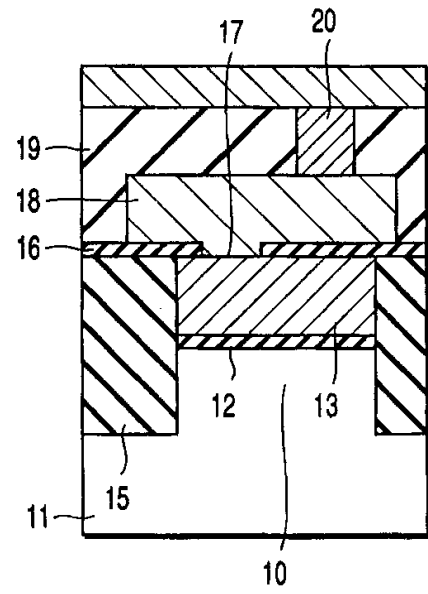




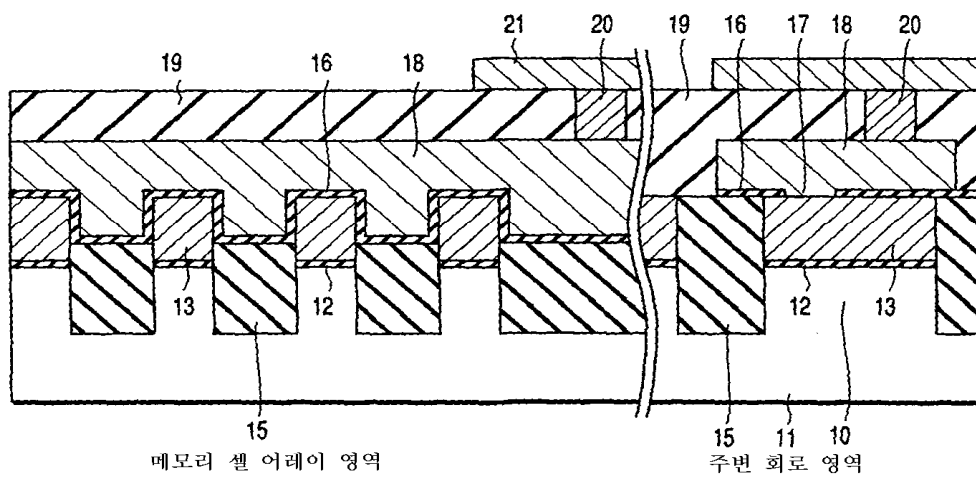
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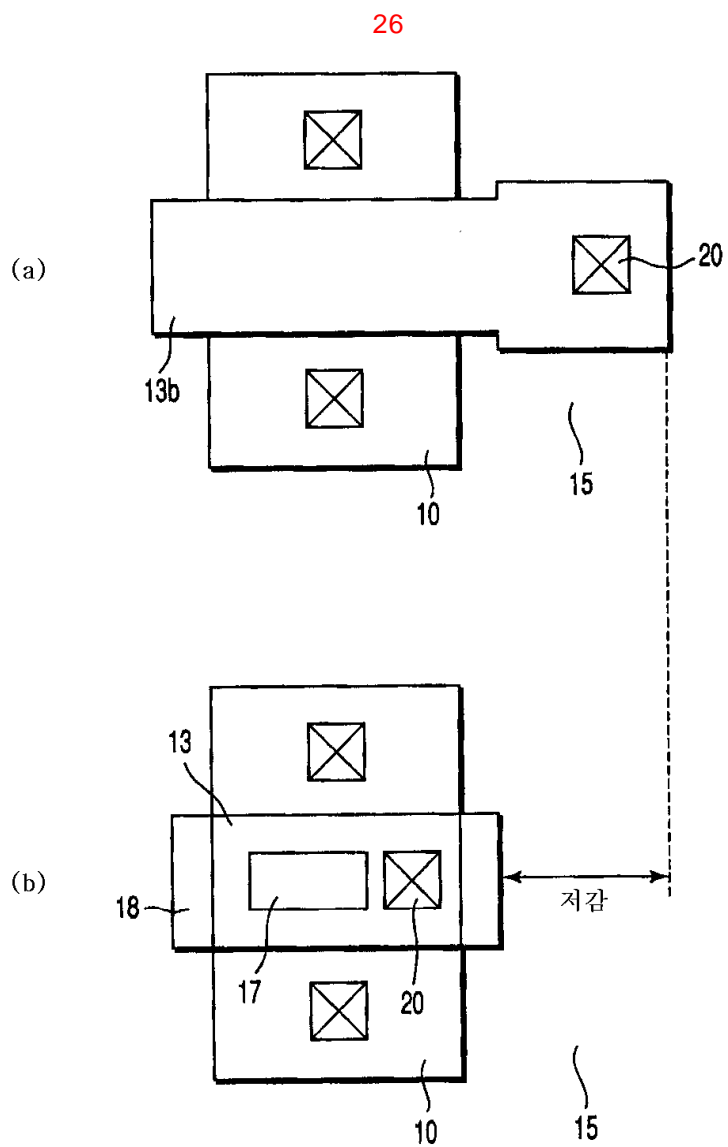


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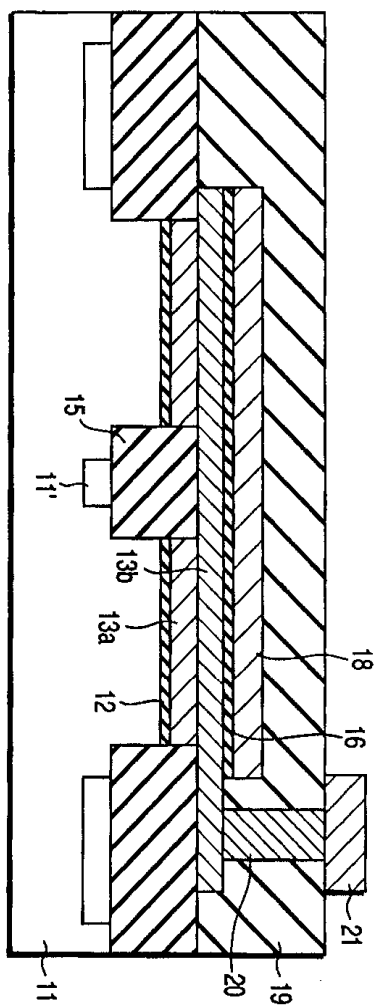


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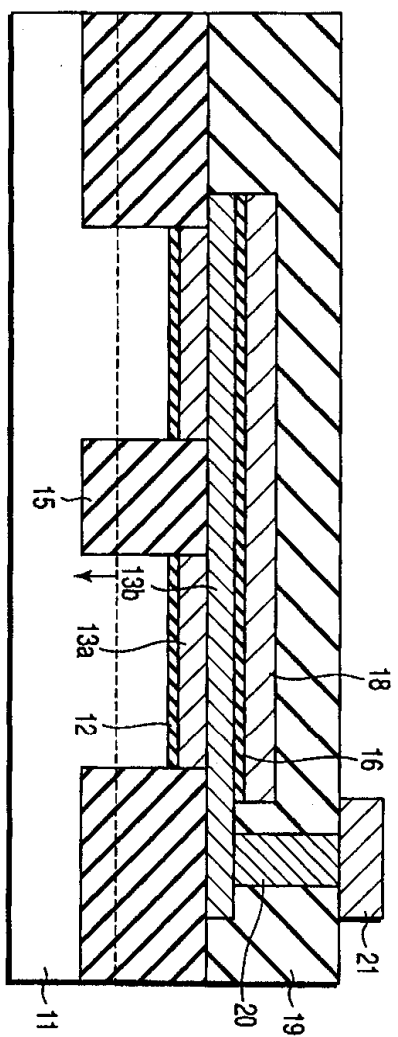




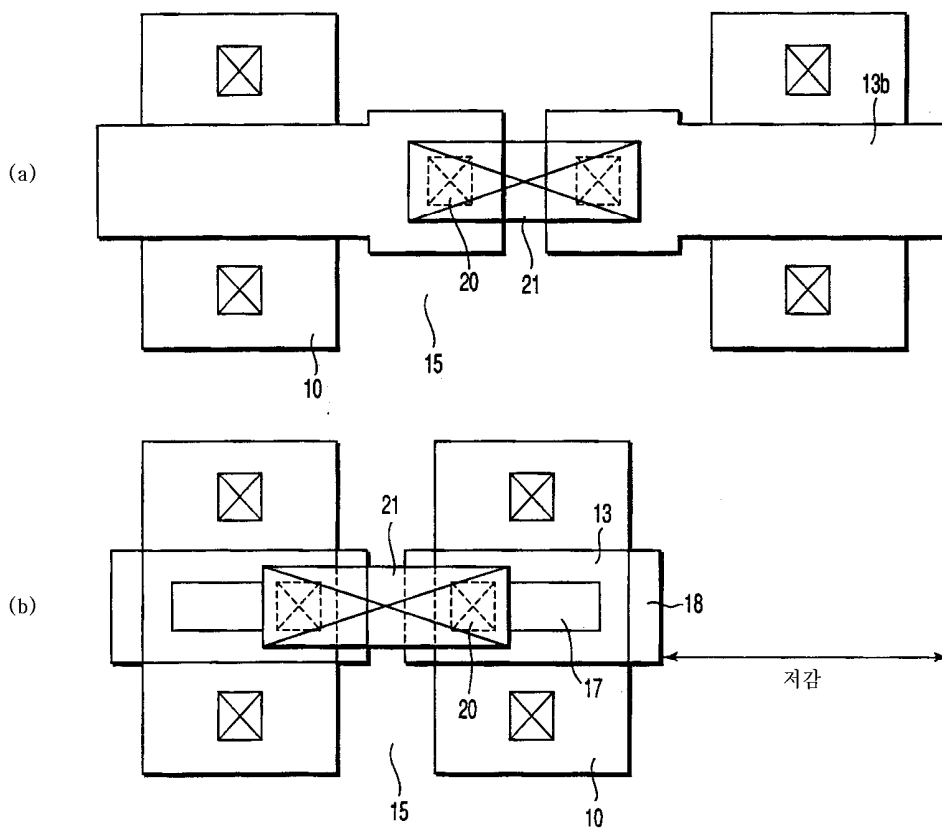
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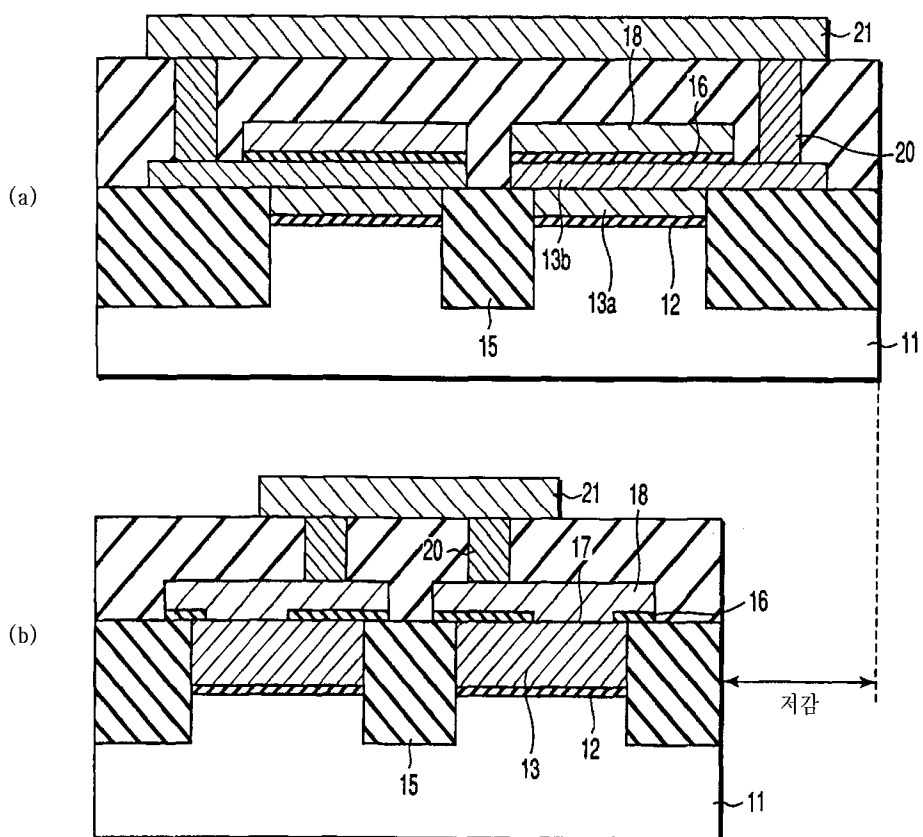
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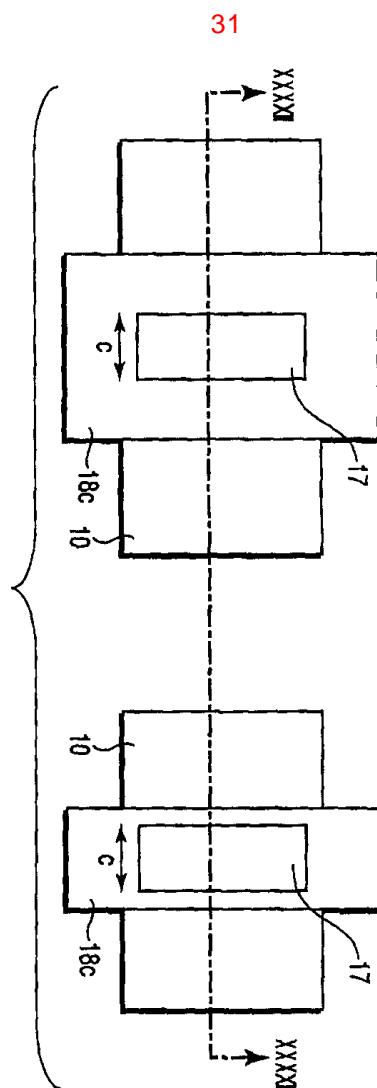


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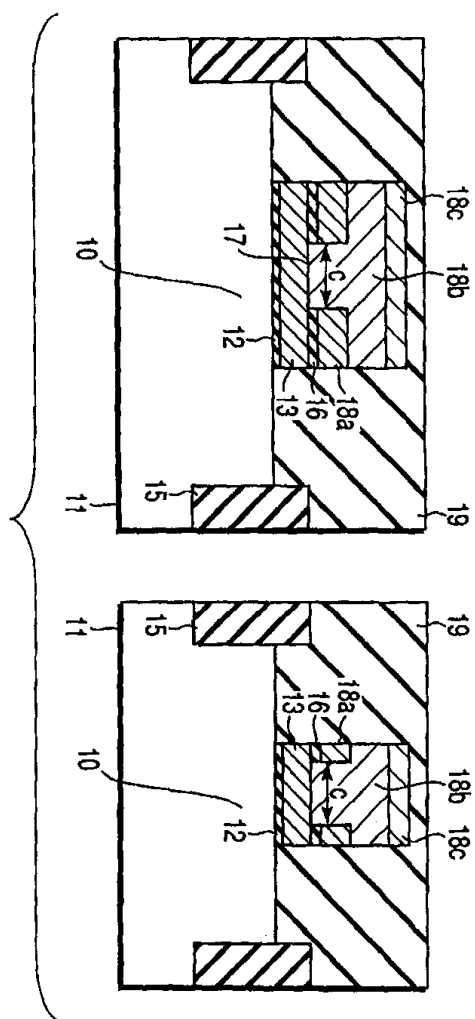


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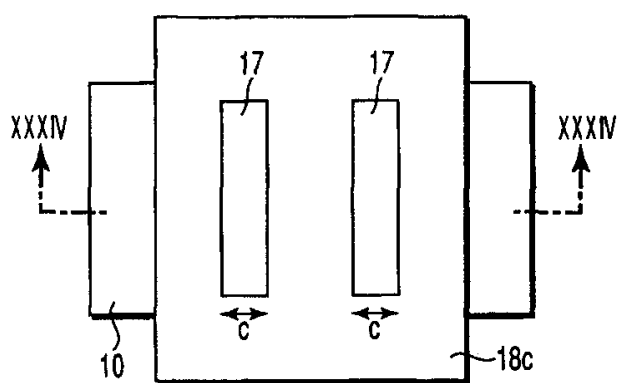




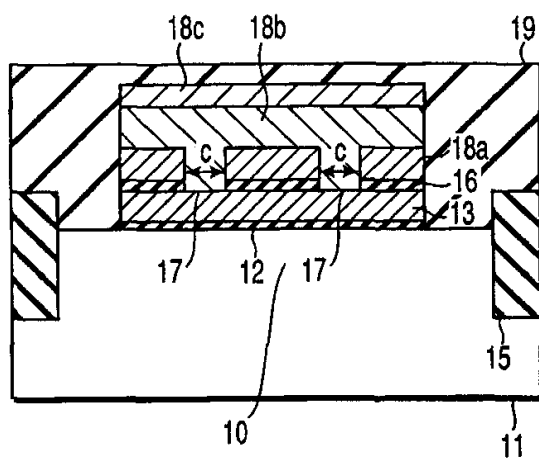
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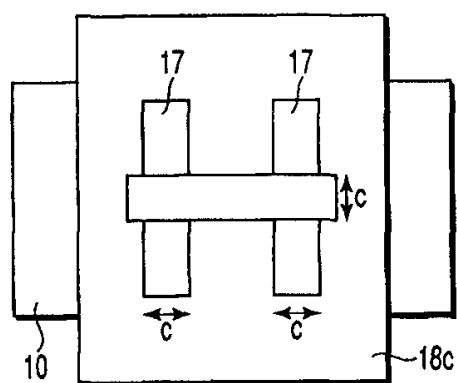
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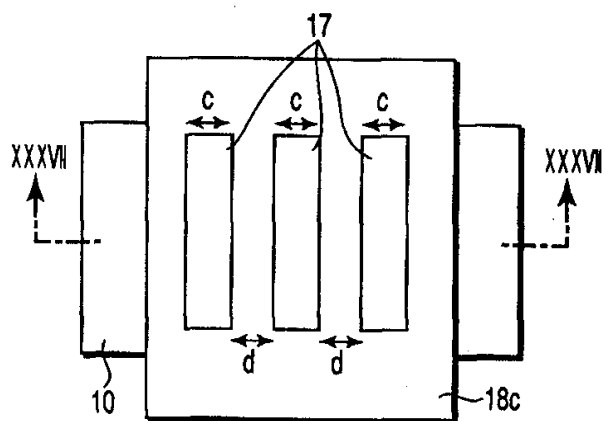
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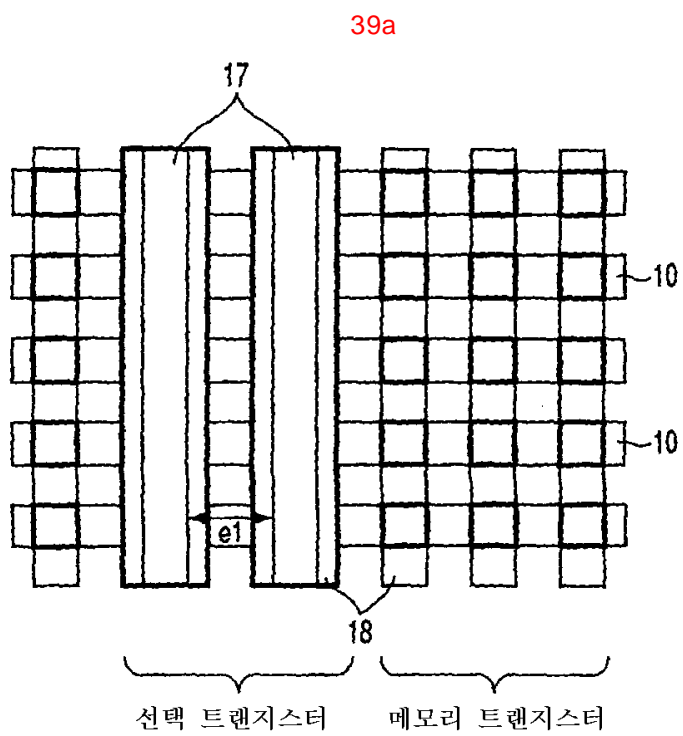
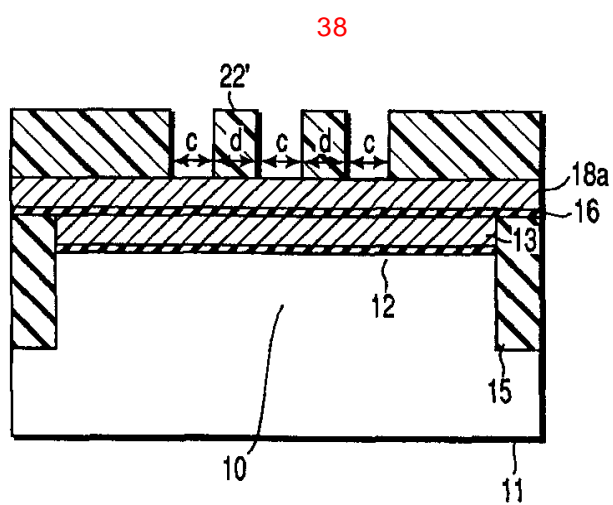
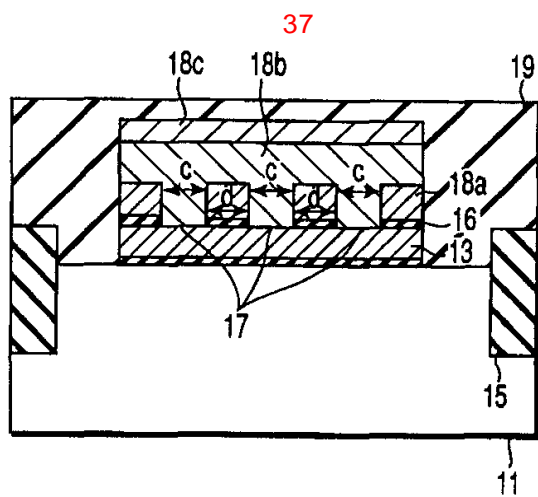


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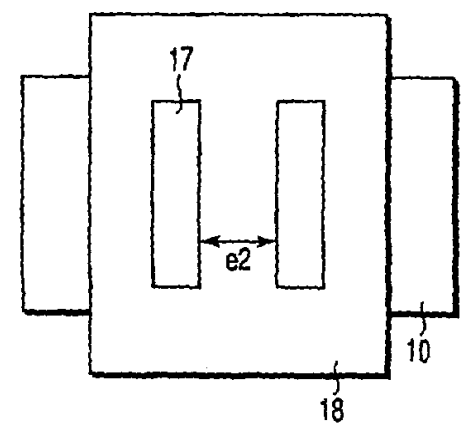


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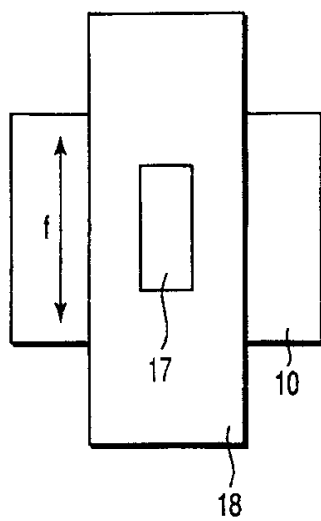


39b

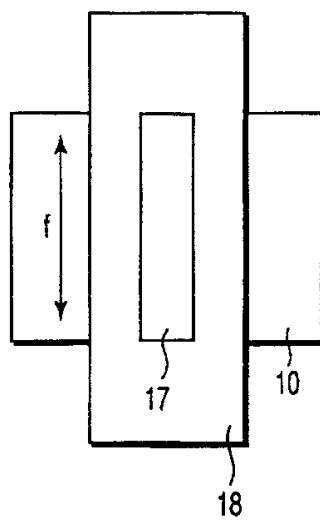


주변 회로 트랜지스터

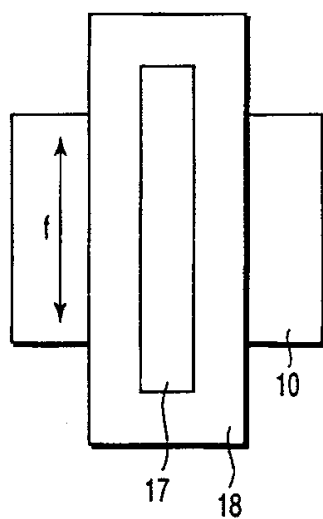
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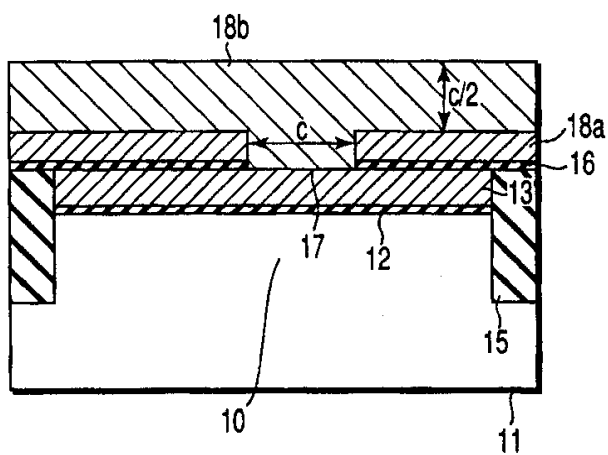
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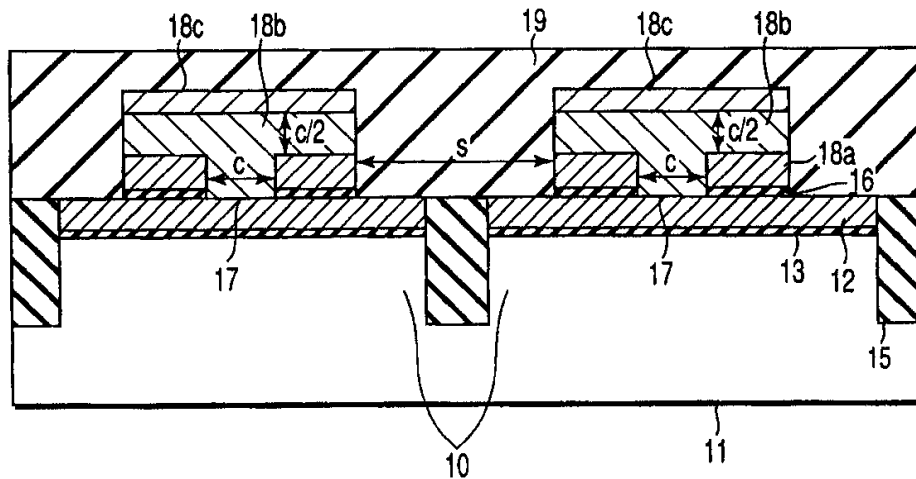
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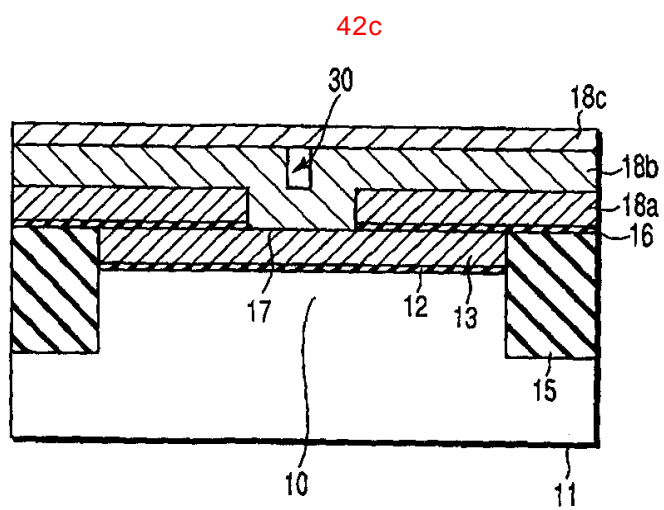
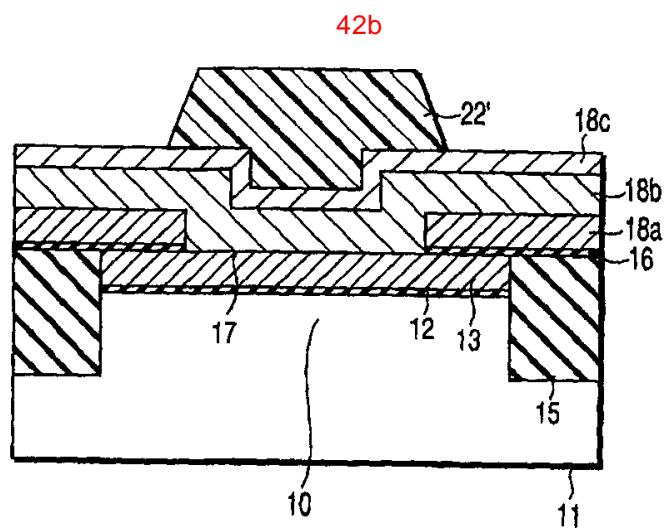
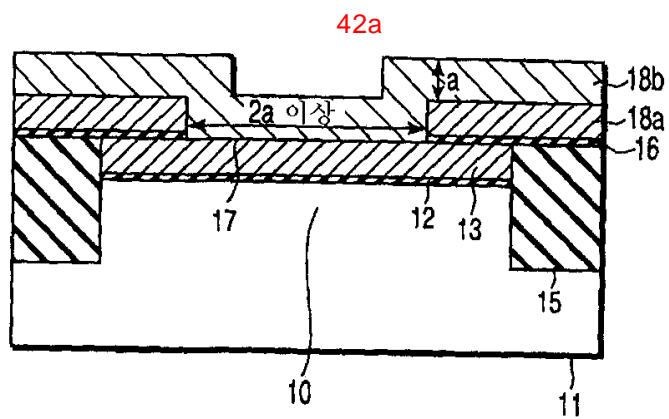


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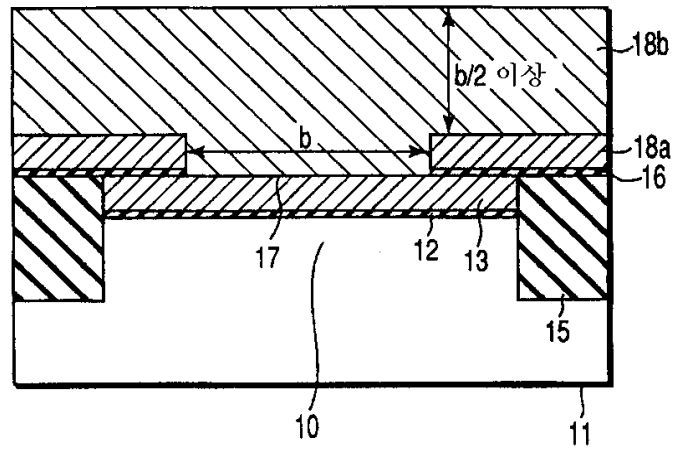


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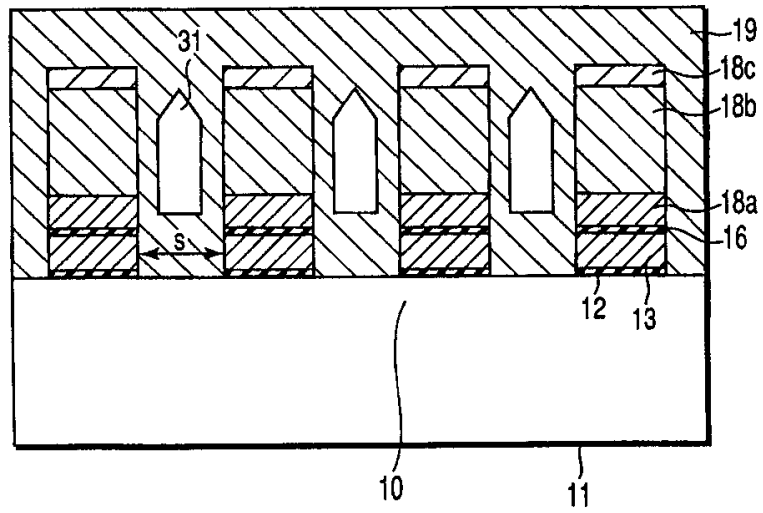




43a



43b



44a

