

(19) (KR)  
 (12) (B1)

(51) 。 Int. Cl. <sup>7</sup>  
 H01L 27/108 (45) 2002 07 24  
 (11) 10 - 0344373  
 (24) 2002 07 03

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(21) 10 - 2000 - 0054154 (65) 2001 - 0039886  
 (22) 2000 09 15 (43) 2001 05 15

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(30) 1999 - 305262 1999 10 27 (JP)

(73) 가 가  
 2 2 3

(72) 2 2 - 3 가 가  
 가  
 2 2 - 3 가 가

(74)

(54)

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(3) y . x , (1) (1) (4) Al Cu  
 (1) , , (2) (2) (2)

1 1  
2  
3 1 x  
4  
5  
6  $C_1, C_2$   
7 1 4 x  
8 2  
9 3  
10 z  
11 z  
12 4  
13 4  
14 4  
15 4  
16 4  
17 4  
18 4  
19 4  
20 5  
21 5  
22 5

23            5  
24            5  
25            5  
26            5  
27            5  
28            6  
29            7  
30            7  
31         z  
32  
33            8      1  
34            8      1  
35            8      2  
36  
37  
38  
39  
40  
41     39                      가

&lt;

2 :

2a, 2a1, 2a2 :

2b, 2bb :

3, 3a, 3b :

4, 4a    4c :

5 :

6, 9, 10 :

7a, 7b :

8 :

11 :

12 :

,

39 LSI  
 , (103) , (103)  
 가 (120) . (101) (120)  
 (105) (106, 107) (102, 104) (102, 104)  
 (108, 109) (106, 107) (105)

, 40 (110, 111) (112) , (112)  
 . 가 (120) .

, 39 (102, 104) , 가 41  
 . , R101, R102 .  
 가 .

, 40 (110, 111) (112) 가 ( ) 0.2 $\mu$ m  
 . , (112) .  
 1 $\mu$ m ( ) .

1 , (下地層)  
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 $0.2\mu m$ 

가

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&lt; 1

1 , 1 (11) , 가 (12) (12)

1 , x Al Cu (3) y (4)  
 (1) (2) (1) (2) (3) (4)

3 1 (3) L (3) S (3) x (3) (3) (3) (3)  
 V1 가 , 0.2 $\mu m$  V2 가 T 0.5 $\mu m$  3 (3)  
 (5)

4 4 5 (A x A) 5

C<sub>1</sub>,

1

$$C_1 = K_0 \epsilon_0 \frac{T \times A}{S} \times \frac{A}{2S} = K_0 \epsilon_0 \frac{TA^2}{2S^2}$$

가 ,  $K_0 = 3.9, \epsilon_0 = 8.86 \times 10^{-14} F/cm$

C<sub>2</sub>,

2

$$C_2 = \epsilon_0 K_0 \frac{A^2}{D}$$

가 , 4 5 D=5L=5S 가 C<sub>2</sub> ,

3

$$C_2 = K_0 \epsilon_0 \frac{A^2}{5S}$$

가 .

, T=0.5μm, A=100μm  
 가 C<sub>1</sub>, C<sub>2</sub> 6 . (L S ) 0.1 1μm C<sub>1</sub>, C<sub>2</sub>, 0.2μm  
 C<sub>1</sub> C<sub>2</sub> 1 , ,

7 1 4 (3) V1 , x 가 (3a) ,  
 V2 가 (3b)

1

가 가

&lt; 2

8 2 7 2  
 1 3a (4) 3b  
 (4a 4c) 3  
 (2) 3  
 , 8 3 (4a 4c) , 4

(3) (1)  
 (3)

3 6 가 .



, 12 7 1 9 3 , 8  
 2 4 ( 18, 19).  
 < 5

20 5 . 5 12  
 4 , V2가 가 (3b) (7b) ( )  
 2) (9) 10 11

(3b), 5 , V1 가 (3a) V2가 가 ( )  
 (7b) (9) , , (1)  
 8) ( )

, (3a) (9)

21 27 5 . 20  
 (4) V2가 가 (7b) (3a) (7a)  
 (9) , V1 가 ( 21).

, 20 (4) , (4a, 4b) (4a, 4b) 20  
 (4a, 4b) 가 ( 22).

, 20 12 , 5 ( 23, 24). 18 19

, 24 2 , 3 , 4 5 ( 6 (4a, 4b) (4a 4e) 5  
 , 5 ( 25 27).

< 6

28 6 . 6 24  
 5 , (4a, 4b) (7a) (4a, 4b) (7a) (7b) (7)  
 b) V1 가 , (7b) (2) 가 W (10) 10 (10)  
 (7a) (3a) . (10) 11

V2가      가      6      (3b),      ,      28      (3a)      (6)      .  
           (6, 9)      V1      (7b)      (6, 9)      (3a),      (7a)      (3b),      (7b)  
           ,      (3a, 3b)      (1)      (8)      (7a)      (6, 10)      .

,      28      (4a, 4b)      (7a)      (7b)      .  
       (9)      (3a)      ,      (7a)      (7b)  
       (10)      (3b)      .      가

<      7

29      7      (4)      29      (3a,  
 3b)      BST      (2b)      (2a)      ,      .

,      30      7      (2a)      (2a)      30      .  
       (3a)      (3b)      (2)      .      .

7      ,      (3a, 3b)      (2a)      .  
       (2)      .      .

,      29      (2a)      30      (2a)      .      ,

<      8

31      z      (12)      29      30      (11)      (1)  
 2)      가      .      (11)      32      ,      (3a, 3b)      (2b)  
 2a)      .      .      .      .      ,      .      (1)

8      ,      (12)  
       (11)      .      .

,      33,      34      8      1      34      (12)      33  
       (11)      (4)      (2a)      (12)      (11)      (11)      (2a1)  
       (12)      (12)      (2a2)      ,      ,      (11)      (12)  
       (2a)      .      .      .      .      .      .

,      35      8      2      (3)      (2b)      (11)      (11)      F  
       .      .      .      .      .      .      .      .

1      8      .      36

, 37 , 38  
C1, C2 , v  
. 36 C 1 8 ,  
C , C , 37, 38  
C 1 8 ,  
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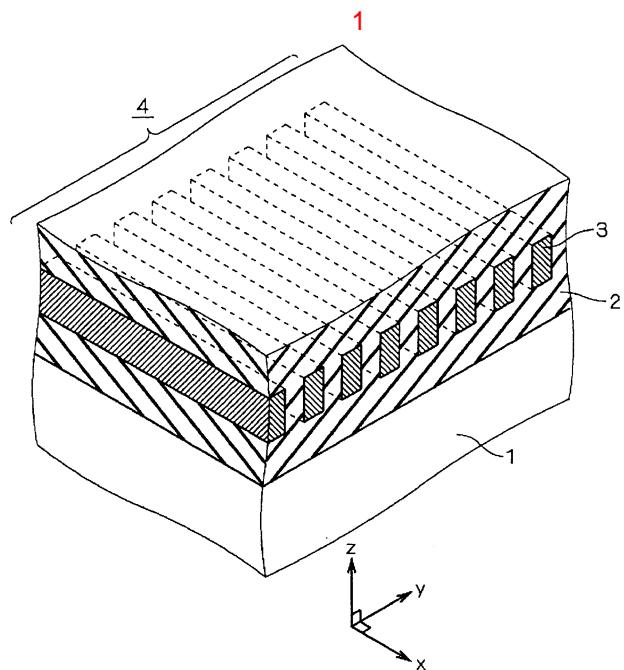
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(57)

1.

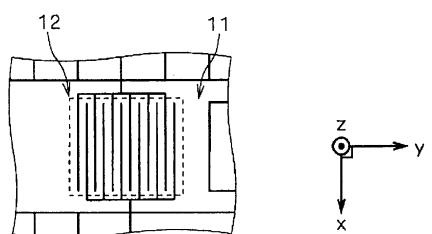
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2



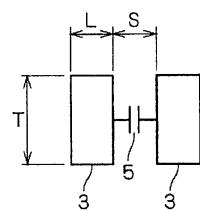
1: 반도체 기판  
2: 절연막  
3: 배선  
4: 라인 앤드 스페이스 구조

2



11: 배선부      12: 캐퍼시터부

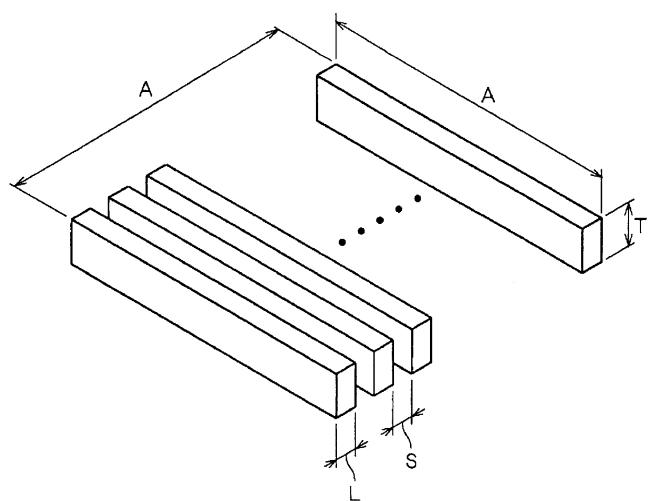
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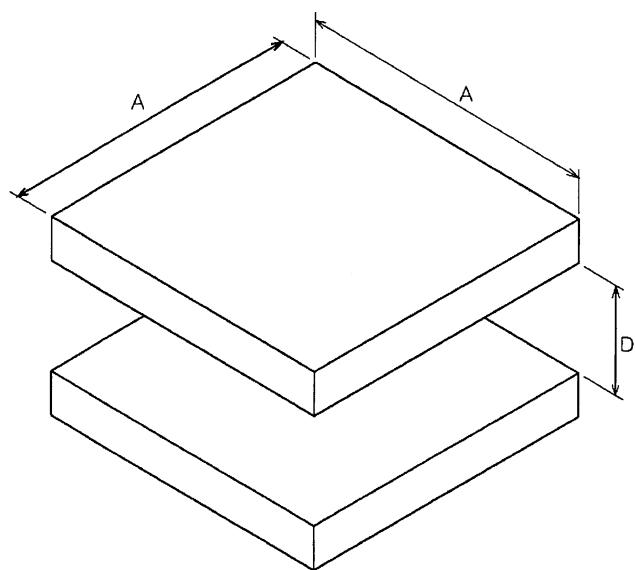
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5: 용량

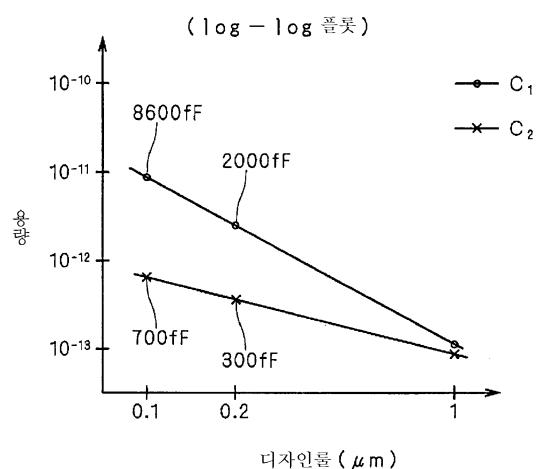
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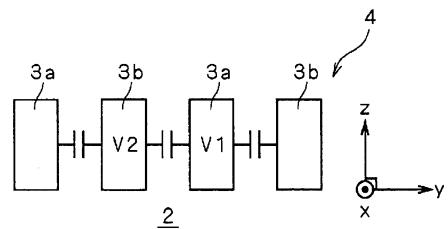
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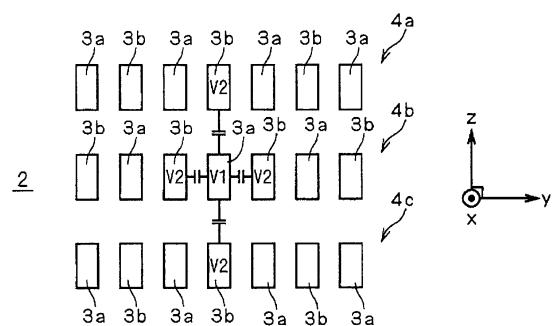


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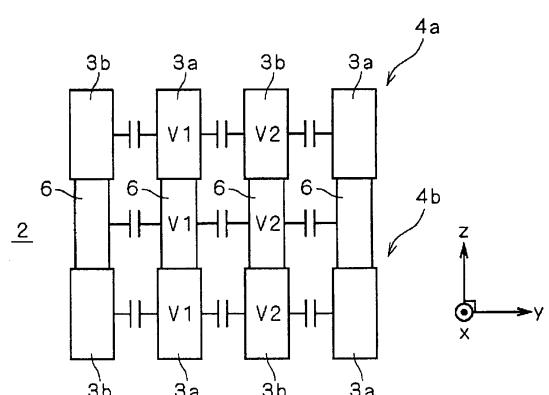
3a, 3b: 배선

8



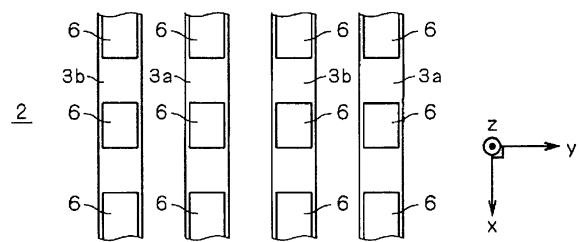
4a~4c: 라인 앤드 스페이스 구조

9

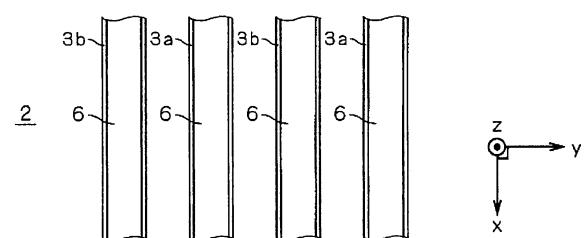


6: 관통 구멍

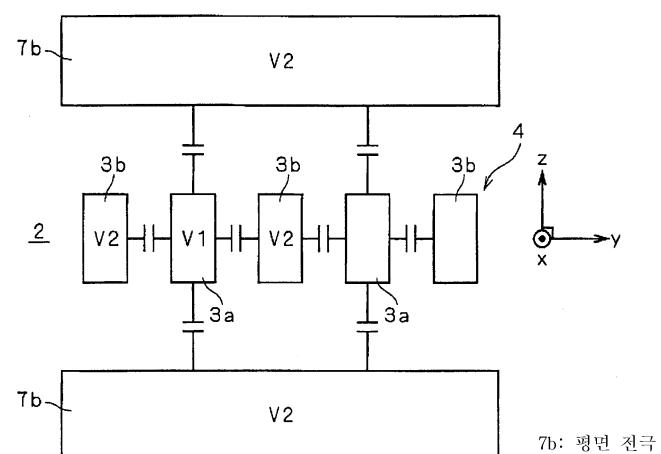
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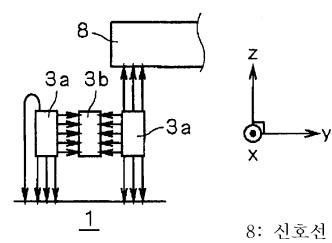
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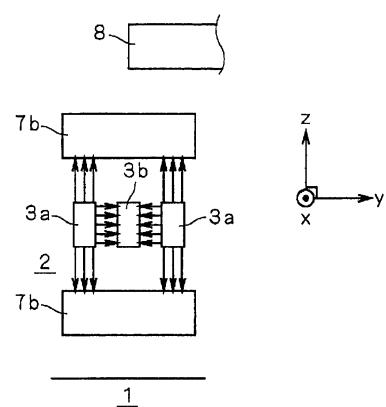
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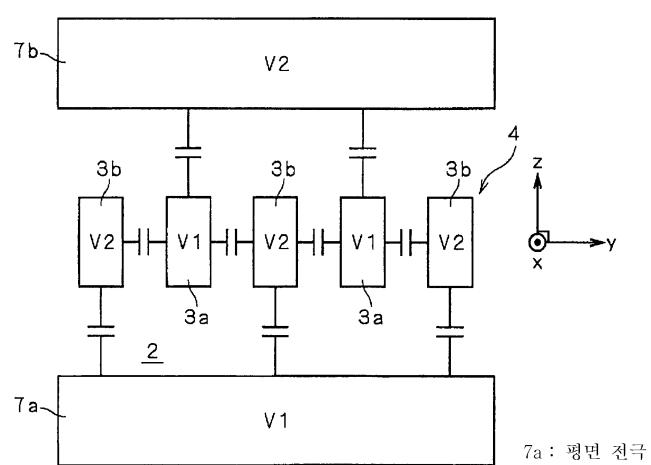
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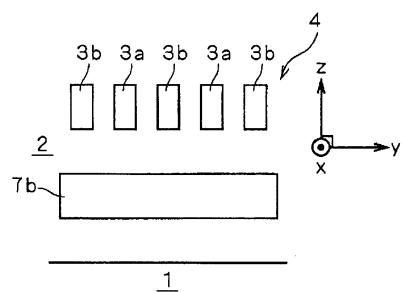
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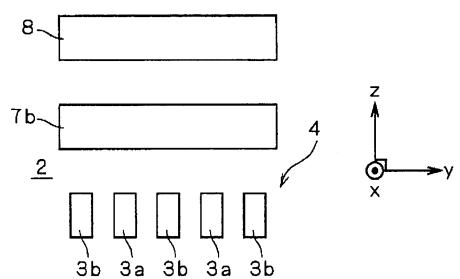
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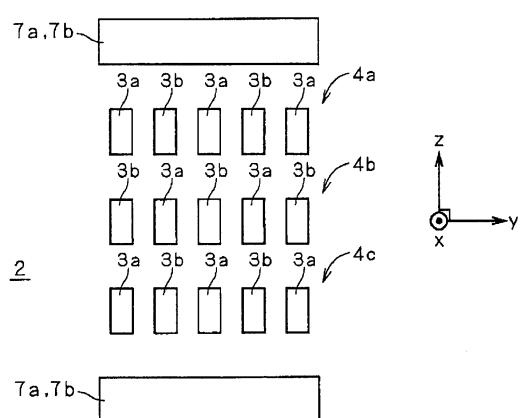
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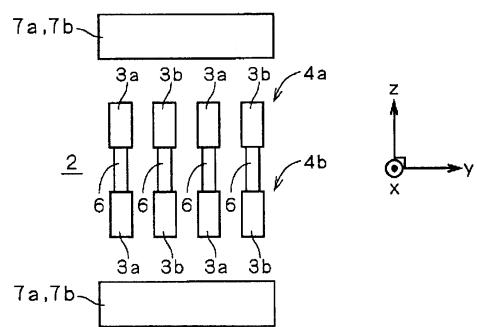
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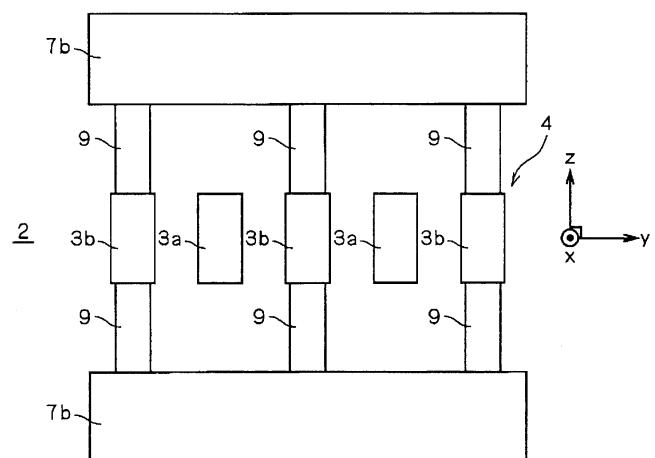
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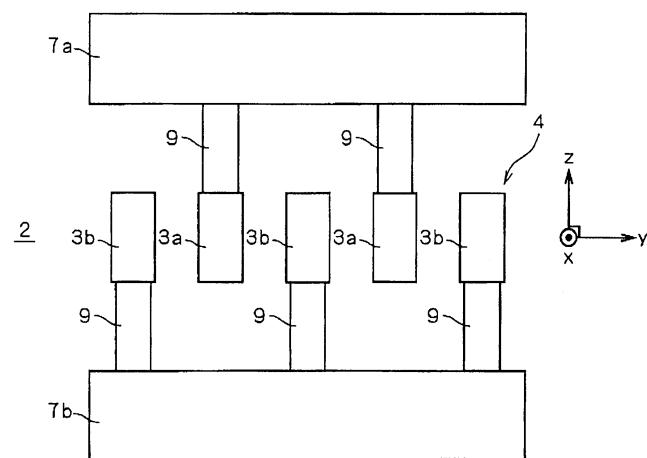


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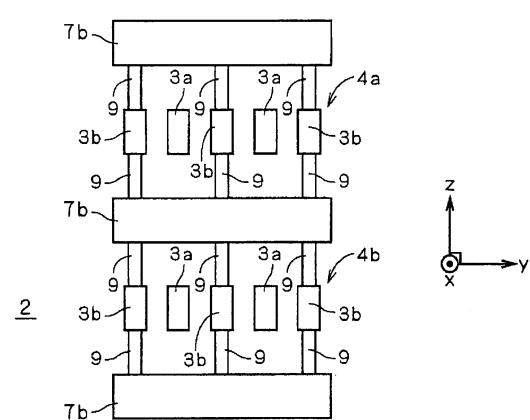


9: 관통 구멍

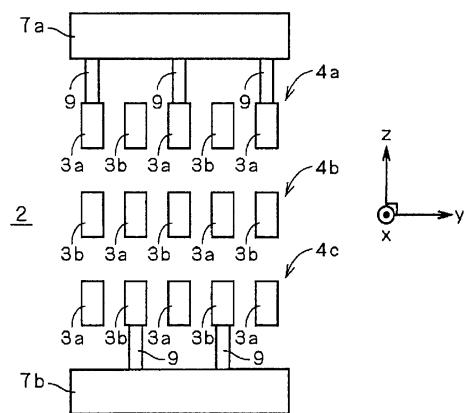
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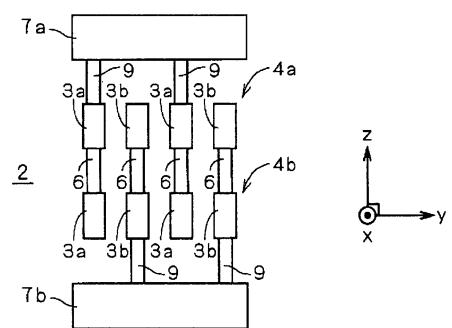
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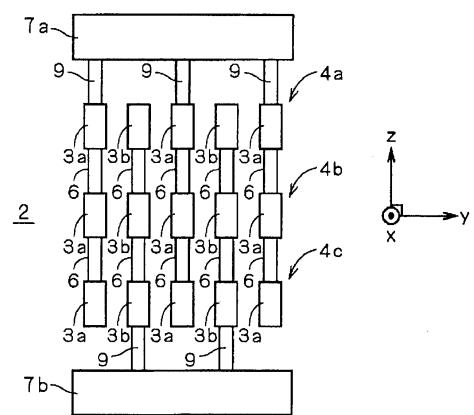
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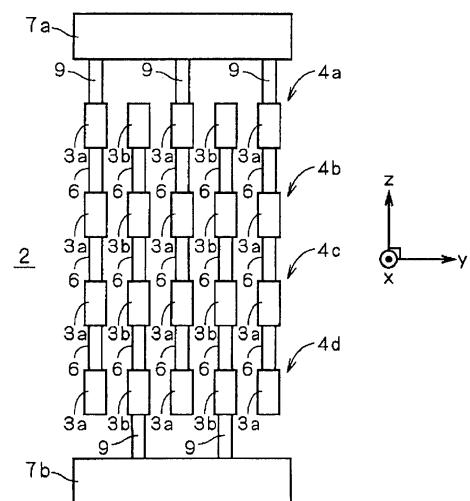
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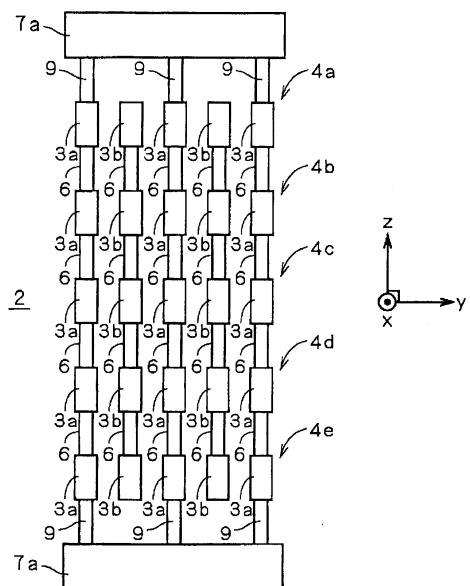
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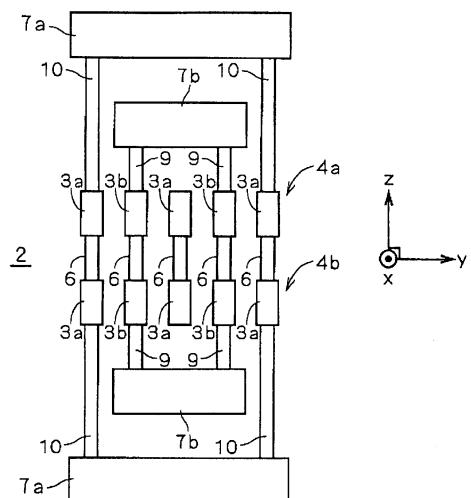
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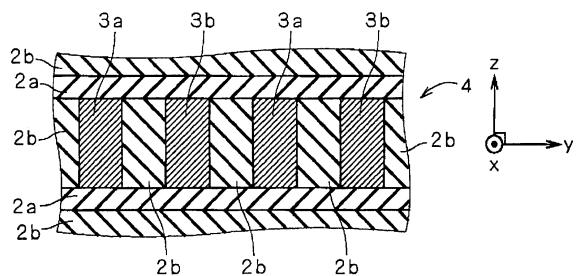


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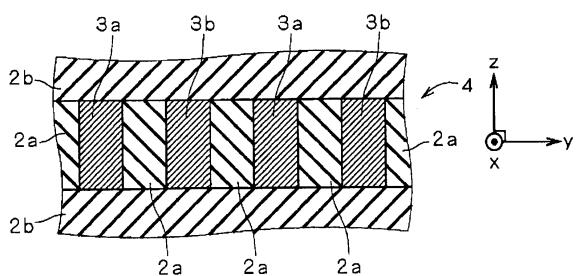


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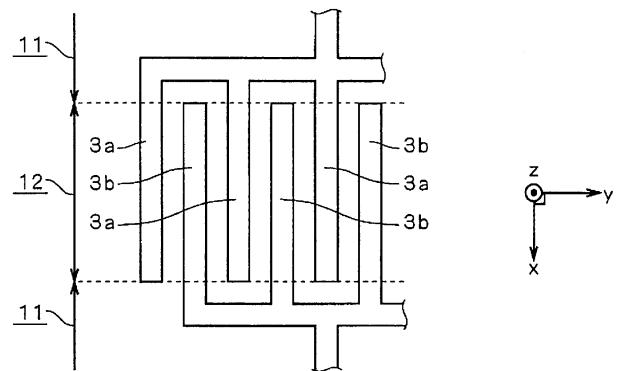
29

2a: 고유전체막  
2b: 실리콘 산화막

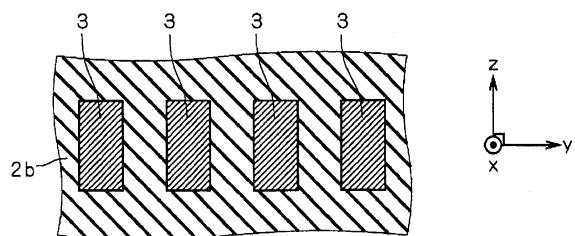
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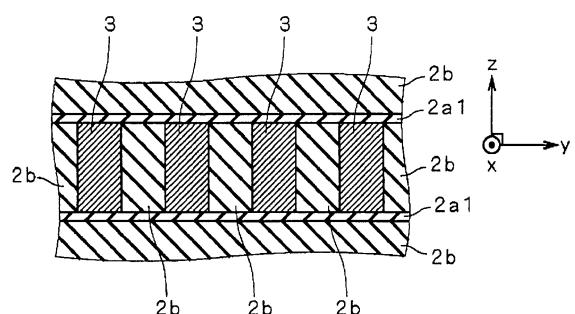
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32

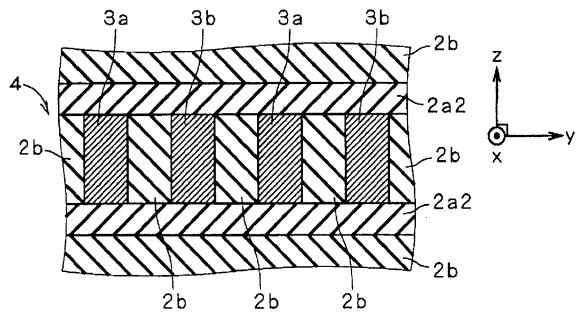


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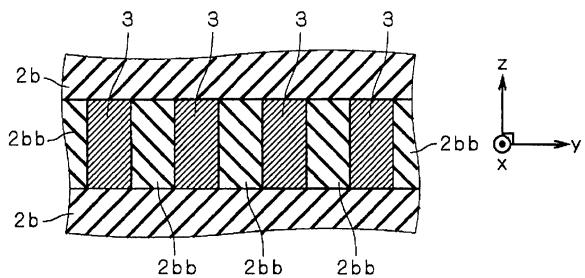
2a1: 고유전체막

34



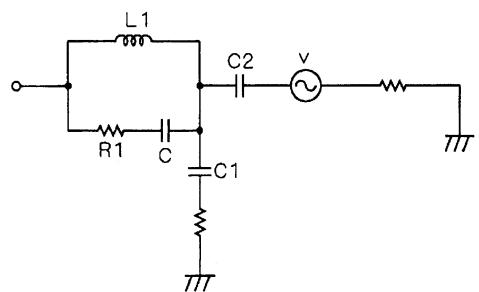
2a2: 고유전체막

35

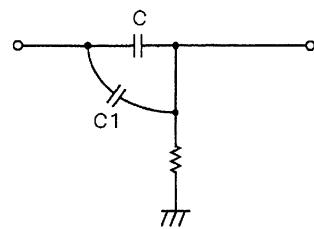


2bb: 실리콘 산화막

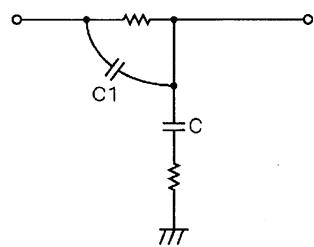
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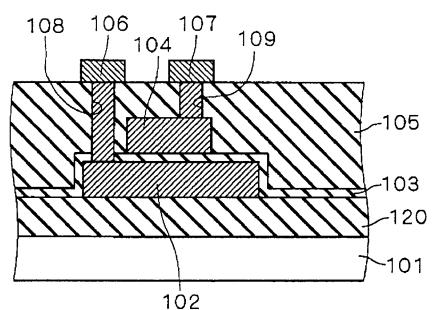
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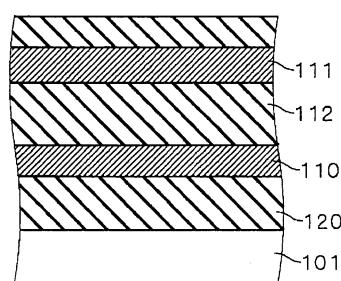
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