

(19)
(12)

(KR)
(B1)

(51) 。 Int. Cl.⁷
H01L 21/027

(45)
(11)
(24)

2003 06 27
10-0389567
2003 06 17

(21) 10-2000-0047881
(22) 2000 08 18

(65)
(43)

2001-0021356
2001 03 15

(30) 11-232358 1999 08 19 (JP)

(73) 211-8668 가 가 가 1753

(72) 5 7 1 가 가

(74)

:

(54) , ,

가 2 . 1 , 1 가 1 2 , 1

6

1a (membrane mask) ;
1b (stencil mask) ;
2 1 ;
3 (EM1) ;
4 ;
5 1 ;

6 ;
 7 1 ;
 8 2 ;
 9 3 ;

*
 1... 11...
 12... 13...
 14... 1 15... 2
 16... 17, 18...
 19... EM1-EM3...
 MM... CM...
 MDM, CDM... W...

(, " "),
 , , ,
 , 가 (cell projection)
 . 가 , , ,
 , 가 5μm
 , (throughput)가 , 가
 1mm 가 , 4 , 가
 , 가 250μm

가 , ,
 , 가 20mm , 1mm
 , 가 250μm , 1/4 6400 1mm
 , 4 1mm 6400 80 x 80
 , ,

1a 1b
 1a , (100) SiN() (101)
 가 30-50nm W() Cr() (102) SiN (101)
 . SiN (101) (103) (103) Si
 , 750μm
 , 1b (200) 가 (202)가
 Si (201) , (202) (203)
 (202) (, 203) (204) (201)
 (205)

μm Si 가 , Si , 2μm 4 , 가
 , 가 ,

(focused ion beam, FIB)

가

가

가

가

1

2

1

2
가

1

2

1

(1)

(MM)

(EM1)

(CM)가

(MM)

(1)

80 x 80

DM)
CDM)

(MM)

(CM)

(MDM)

(2)

(CM)

(M
MDM)

(MDM

CDM)

Si (1)

1 mm

1b

가

CM)

6400

(MM)

(MDM)

(1)
6400

(CDM)

(MM)

(CM) , 1:1

(MDM CDM)

3

(EM1)

(11),

(12),

(13)

(11)

(EB)

가

(12)

(13)

(EM1)

(W)

X Y
X

Y
(W)

(EM1)

(11)

(EB)

(EM1)

(12)

X Y

1
(EM1)

(14)

2

(15)

1
(11)

(14)

2

(W)

(14

MDM CDM)

(16)

1
가

(13)
X Y

(14)

(EM1)

1

(12)

(17 18)

(13)

(EM1)

(16)

(EM1)

(W)

(17 18)

(16)

(12) (EB) (16) (EB) (W) 2 (15)
 (EB) (MM) (11) (S205). (S206).
 (CM) (CDM) (MM) (MDM) (MDM)
 (CM) (CDM) (16) (MM) (MDM)
 (MM) (MDM) (12) (CM) (CDM) (C
 M) 6 (MDM) (1) (5) (MDM)(6) (MM) 가
 (MM) 가 (CM) (CDM)(6)가
 (MDM) (MDM)(7) (MM) (MDM)
 (CM) (CDM) (MM) (MDM)
 (CM) (MM) (MDM)
 1 (MM) (MM) (CM) (CM)
 (MM) (CM) (MM) (CM)
 (MDM) (CDM) 가 (CM)
 1 (MM) (MM) (CM)
 (MDM) (W) (MM) (S301-S303), (MDM)
 (16)가 (MDM) (19) (MDM)
 (MDM)가 (S304). 6 (16) (M
 (MDM) (MDM)
 (S305). (16) (CM) 1 (14) 1 (C
 14) (CDM) 2 (15) (MDM) (MDM) (S30
 6). (16) (W) (CDM) (S307). (13)
 (CM) (W) (CDM) (CM) (S308). (MM)
 (CM) (MM) (CDM) (CDM) (CDM) (MM)
 가 1 (14) (EB) (12)가 (MM)
 2 8 2
 1 () (EM2) (1) (M
 MM) (EM1) (MM) (MDM) (M
 M) (CDM) (CM) (MM) (MM)
 (MDM) 가 2 (CM) (MDM) 가 (CDM) (MM)
 (MDM) (MDM) 가 가
 (MDM) (CM)

(MM)가 (EM2) (MDM) (MDM) (MM)가 (CM)가
(MM) (MM) (MM) (CM)가 (MDM) (MDM) (MM)
(MM) (MDM)가 (MDM) (CDM) (CM) (MM) (EM2)
(CM) (CDM)가 (CDM)가 (CDM)가 (CM)
(CDM)가 (CDM)가 (CDM)가 (CDM)가
2 (EM2) (EM2)가 (MM) (MDM) (MDM)가
1 (19) (MDM) (CDM) (MDM)가
(19) (MDM) (W) (MDM) (CDM) (MDM)가
(16)가 (19) (19) (16) (MDM) (CDM)
(MDM)가 1 2 (14 15) (MDM) (CM) (CM)
(CDM) (MM) (MDM) (CM) (MM) (CM)
(MDM)가 (CDM) (CDM) (CDM) 5
(CM) (CDM) (MM) (MDM)
(MDM)가 (CM) (CDM) (MM) (MDM)가
(CM)가 (CDM) (CDM) (CDM) (CDM)가
(CM)가 (CDM)가 (CDM)가 (CDM)가
3 9 3
1 () (EM3) (1) (M
M) (MM) (EM1) (MM) (MDM) (MDM)
(CDM) (CDM) (CM) (CM)가 (MM) (MM) 2
3 가 (CDM) (MDM) (MDM) (MM) (MDM) (CDM)
M) (MDM)가 (MDM) (MDM) (MDM) (CDM) (C
3 (CDM) (CDM) (MDM)가 (CDM)가 가 가
(CDM) (MDM) (CDM) (CDM) (CDM)가 (MM)
(EM3) 2 (EM3) (CM) (MM)
(MDM)가 (CDM) (CDM) (CDM) (CDM)
3 (EM3) 2 (MDM)가,
7 (CDM) 5 (CM)
(CDM) (MM) (MDM)
(EB) (MM) (MDM) (CM)
(CDM) (CDM) (CDM) (CDM)
MDM)가 (CDM) (MM) 2 (MDM)가 (CM)
(CDM) (MM) (MDM)가 (CDM) (CM)

(MDM) 가 (CM) 가
, (MM) (CM) 가 (1) , 1
, (MM) (CM)가 . ,

, 가 , 가 ,
가 , 가 ,
가 , 가 ,

(57)

1.

, 1 ; 2
1

2.

1

3.

, 1 2 , 1
1

4.

3

5.

, 2

6.

, 2

7.

1

8.

, 1 가 2 1 1 1 가
1

9.

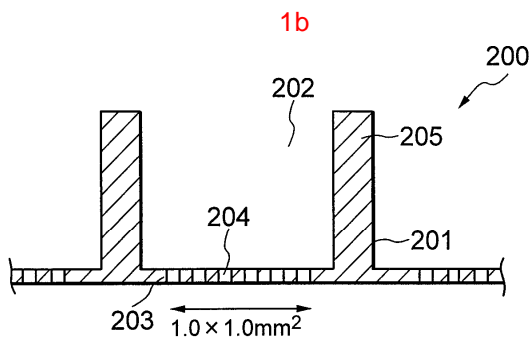
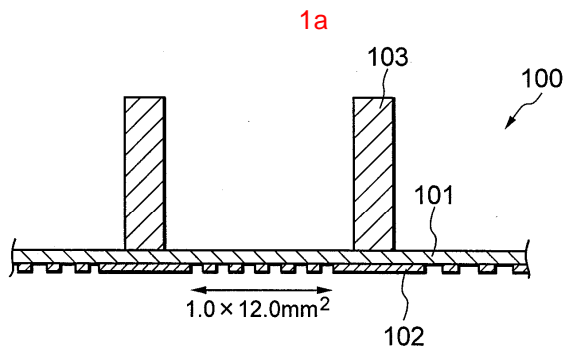
, , 1 ;
1 1 , 1 2 2 ;
1 1 , 가 1 , 1 2 2 ;
1

10.

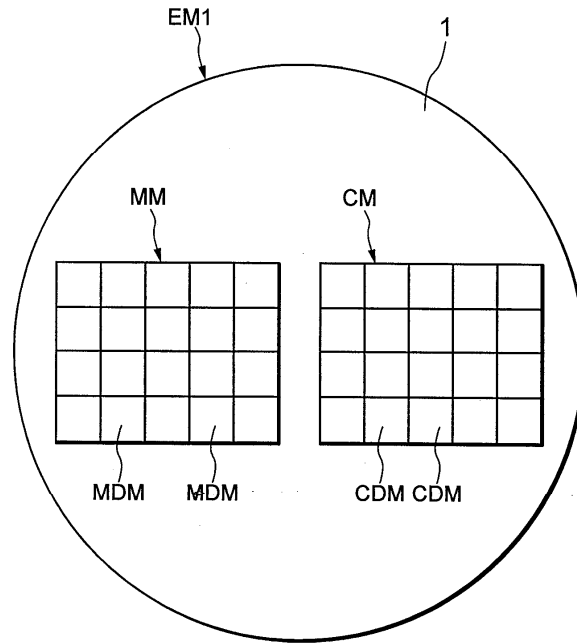
8
11.

9
12.

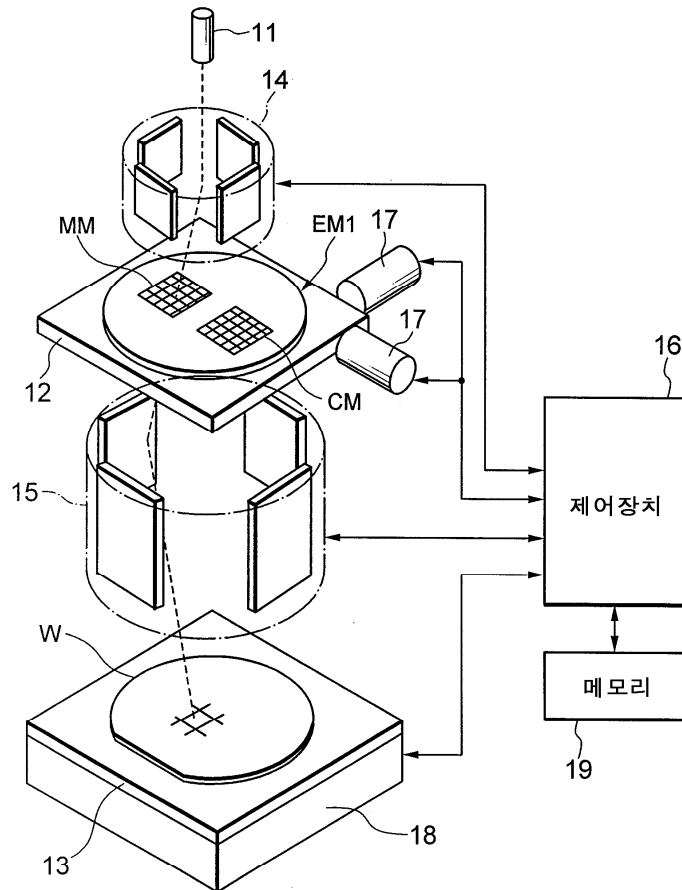
1 , ;
2 , 1 가 ,
가 가 ; ;
1 1 ; 2 ;
1 1 2 가 1 2
1 ; 1 2 가 1 2
1 2 가 1 2



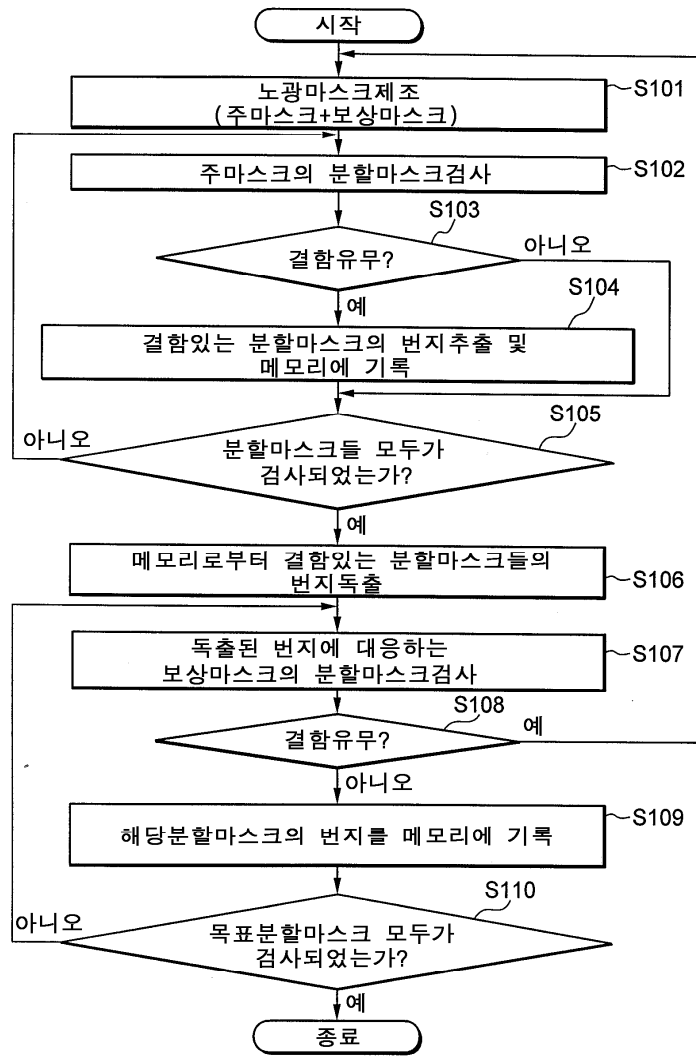
2



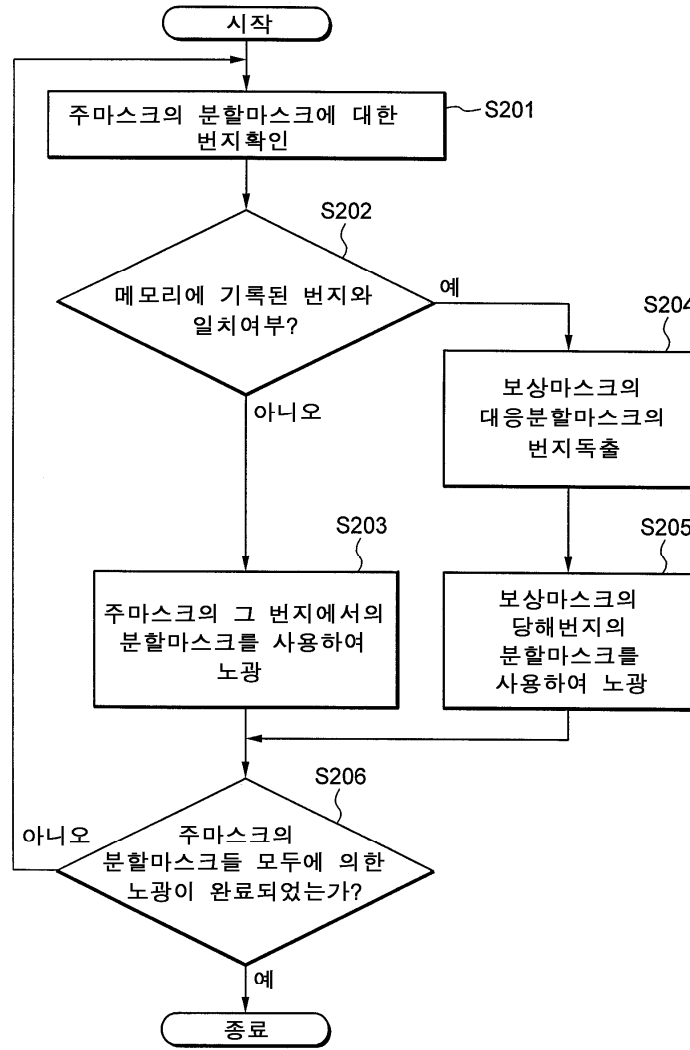
3

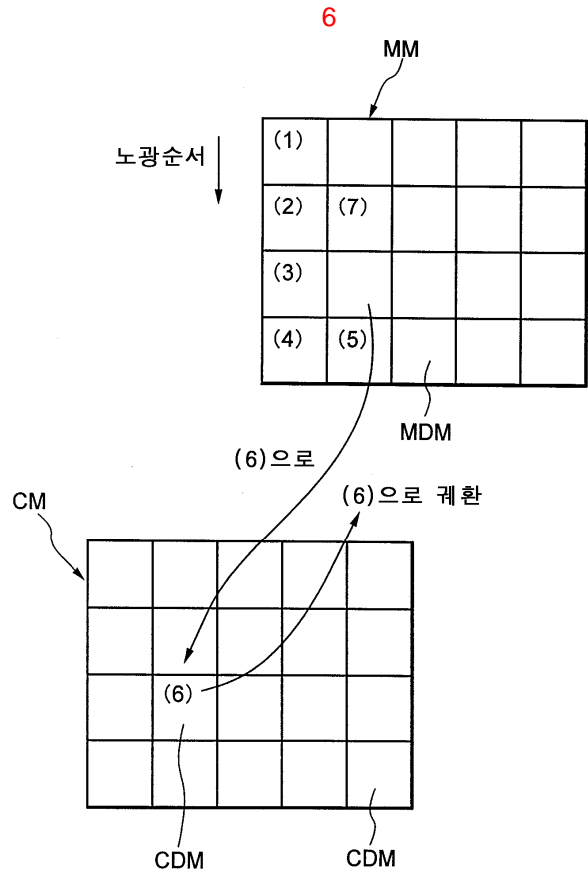


4

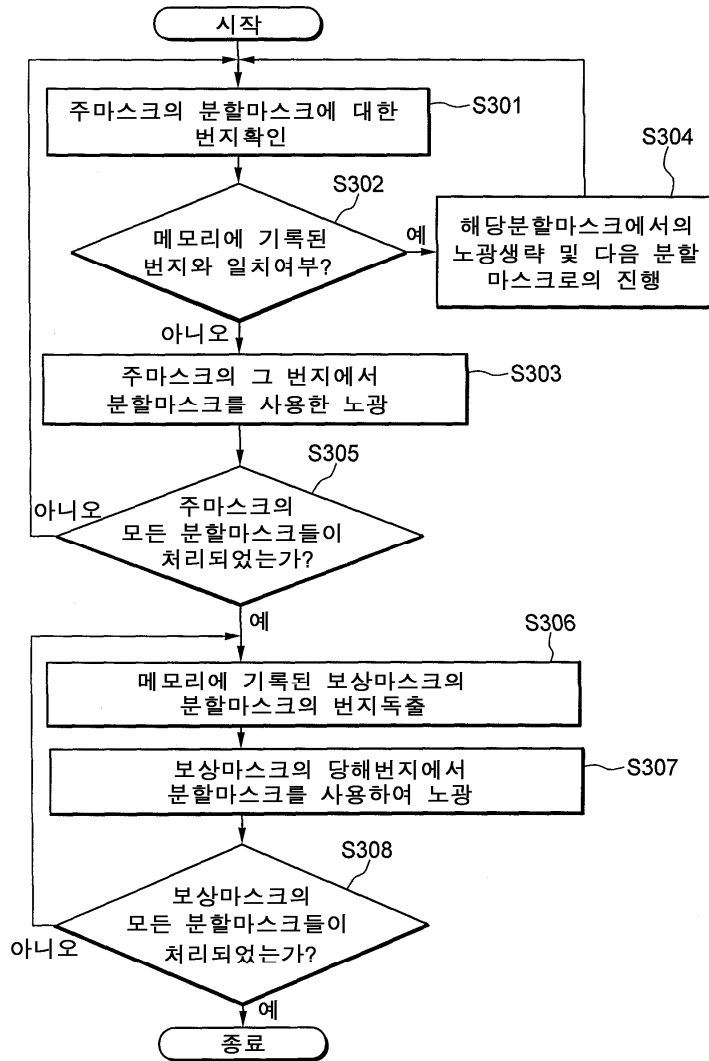


5

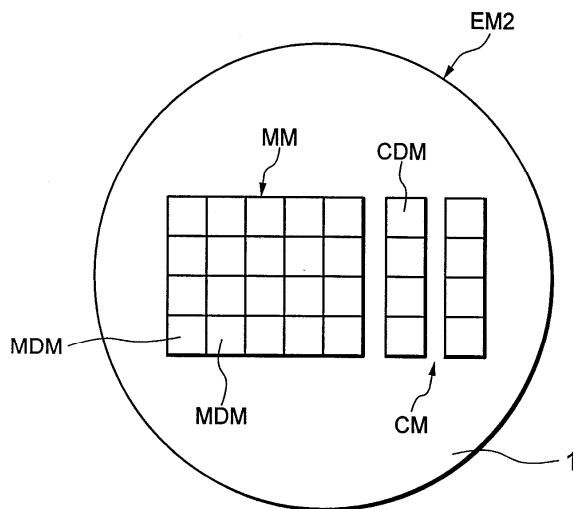




7



8



9

