

(19)
(12)

(KR)
(A)

(51) 。 Int. Cl.7
H01L 21/28

(11)
(43)

10-2004-0051189
2004 06 18

(21) 10-2002-0079073
(22) 2002 12 12

(71) 136-1

(72) 59 5-501

(74) :

(54)

2e

1

2a 2e 1

3 2

4 3

*

21 : 22 :

23 : 24 :

25 : 26 :

27a : 1 27b :

27-1 : 28a :

29a :

가

가

64M , 128M

, 가 (Giga bit) DRAM

1

1 , / (11) (12) (13) (via hole) (13) (14) (14) (15) (15) (14) (Ti) (WF₆) 가 (11) (12) (13) (14) (Chemical Vapor Deposition; CVD) (TiN) 가 Si

H₄ H₂

(15) (14)

(13) (filling) (15) (step co
verage) (nucleation layer) (High electri
c resistivity) (15a) , H₂ 가 SiH₄ 가
(low electric resistivity) (15a)

(15) (16)

(16)

(line sheet resistivity)
가 .

2a 2e 1

2a / (21) (21) (22) (23)

22) 250nm 400nm (High Density Plasma Oxide)

ning) (23) (21) 300:1 (native oxide) BOE(Buffered Oxide Etchant) 20 (pre-clea 50

(24) (Ti, 24) (PVD) 5nm 20nm (Ti-silicid
, 700 850 (TiN, 26) (PVD) 10nm 30nm
e, 25) 가 (RTA) (21) 10nm 30nm

(25) (F) (11) (Ohmic contact)

1 (27) (26) (23) 2 (CVD)

1 (27) 2 가 WF₆ 가 SiH₄ (27a)
 , H₂ , H₂ , WF₆ , H₂ , H₂ , (27b)

1 (27) 2 10nm 20nm (23)
)

2b (22) 1 (27) (CMP)
 (27-1)

1 (27) (26) (24)
 (22)

(23) (27-1) (27a) (27a) (27a)
 (27b) (27-1)가 (27-1)'

2c (27-1) (22) (28)

(28) (CVD) 5nm 120nm (Ruthe
 nium precursor) 가 (O₂) , 250 500 ,
 0.1torr 10torr , 가 400sccm 1000sccm ,
 10% 40%

Ru(MeCp)₂ , Ru(tmhd)₃ , Ru(mhd)₃ Ru(od)₃
 , 가 (O₂)

(28) (N₂) (O₂)

(28) (melting point) 2310 100nm
 8 μ cm 9 μ cm CVD 19 μ cm 20 μ cm ,
 가 RuO₂

(28) (29a) 2 (29b) 2 (29b)
 (30) (29a) 230nm 330nm
 , 2 (29b) (PVD) 50nm 100nm

(30) 2 (29b)

2d (30) 2 (29b) (2
 9a)

2e 3 (29b) (29a) (28)
) (28a) (28a)

(28a) (29a) (Capping layer, 32) 5nm 30nm

2e 1

(Rs)

, (ALD) (PVD)
 가 .
 3 2 .
 3 dual damascene) , / (42a) (43a) (41) ((CVD) (44)가 (42. 43) , (42a) (45) (42a) (43a) (44) (43a) (43a) (45)
 , (42a) (43a) .
 4 2 .
 4 , (42a) (43a) (42. 43) , (42a) (43a) (45a)
 4 , (42a) (43a) , (42a) (43a)

가 가 . , 가

(sensing margin) 가 .

(57)

1.

;

;

;

2.

1

3.

2

, SiH₄

H₂

4.

1 ,

50nm 120nm

5.

;

;

;

6.

;

;

7.

;

;

;

;

;

;

8.

7

,

,

,

SiH₄

;

H₂

9.

7

,

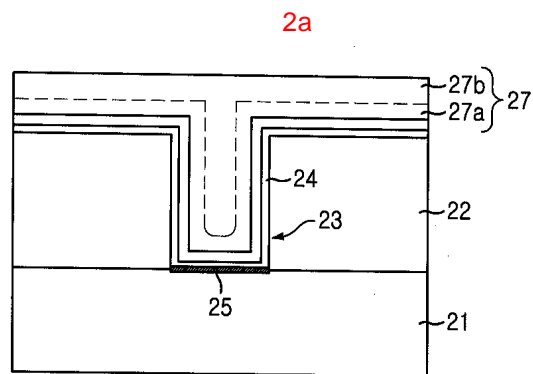
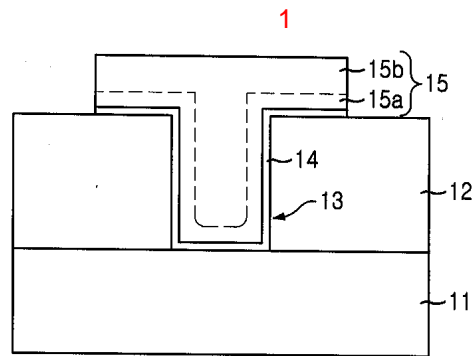
50nm 120nm

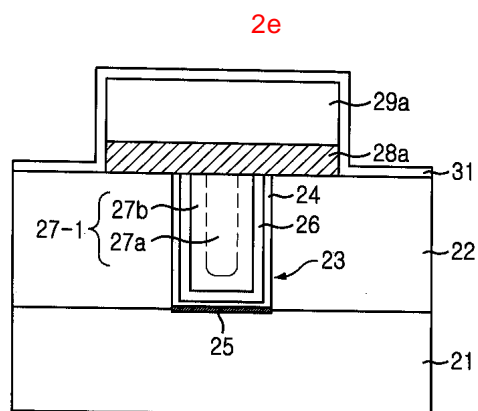
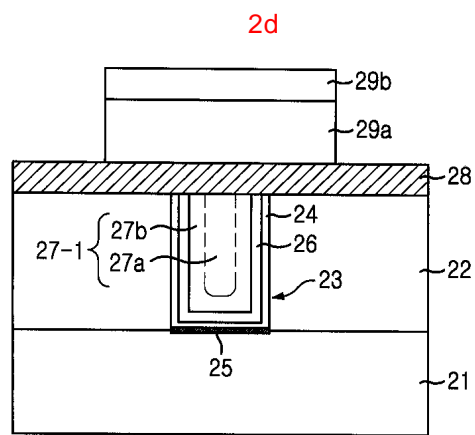
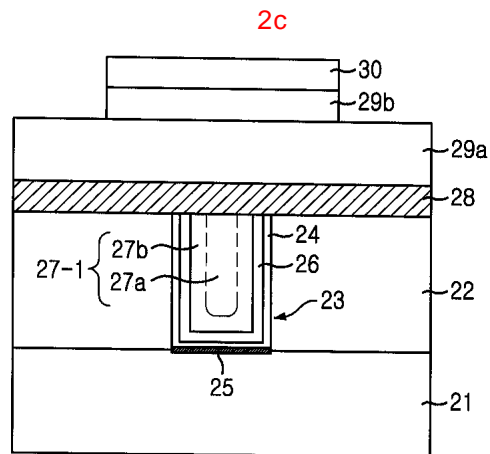
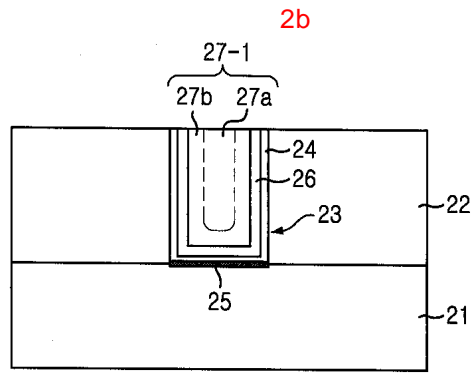
7 10.

2 ;
2 ;
2 ;
2 ;

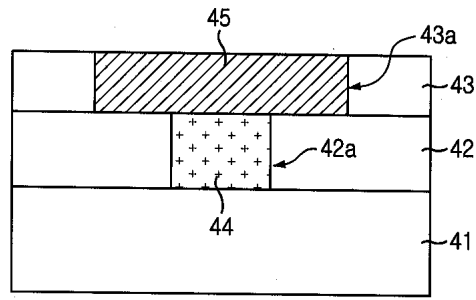
10 11.

2 ; 50nm 100nm





3



4

