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(22) 1999 11 03

(65) 2000 - 0035211
(43) 2000 06 26

(30) 09/187,238 1998 11 05 (US)

(73) 가 가
가 가
가 22 22

(72) 98607 2216
- 98683 1511
98683 32 16804
98683 18701 - 27

(74)
:

(54)

; FE ; p- ;
L1 FE ; 10n
m 40nm ; L2 가 FE
(L2 L1+2) ; 1 ;
; 2 ;

, ; p - ;
 ; FE ; FE L1 ; FE
 +2 ,) L2 가 FE (L2 L1

6

- 1 MFMS ;
- 2 MFMS ;
- 3 - 5 MFMS ;
- 6 MFMS ;
- 7 - 9 MFMS ;
- 10 MFMS .

MOS ,

MOS

(MFMS) : - - - (MFMS) -
 2 2 1

, 1 , MFMS (10) (10)
 (12) (14), n+ (16), n+ (18) (FE)
 (20) (20) (22), FE (24), (26) (30),
 28) (32), (34)
 , MFMS (36) (10)
 (14) n- (38)

FE

Pt, Ir, Zr, IrO, ZrO,

1 . , 가 가 , , 가 . nm , 가 .

0nm L1 40nm ; FE ; p- ; ; CVD FE ; ; L2 가 FE 1 (L2 L1+2) ; 1 ; 2 ; CVD ; ; p- ; L1 ; FE ; FE ; L2 가 FE (L2 L1+2) ;) .

3 , MF MOS (SIMOX) , (40) (42) , 1 (trenching) .

V , n- $5.0 \times 10^{11} \text{ cm}^{-2}$ p- $5.0 \times 10^{13} \text{ cm}^{-2}$, 30keV 180keV (45a,45b) , p- (44) (42) 1.0 $\times 10^{12} \text{ cm}^{-2}$ 1.0 $\times 10^{13} \text{ cm}^{-2}$, BF₂ . 10keV 50keV ,

3 , 300 500 , 100nm 300nm (PSG) (46) . 20nm 50nm , (cap)(48) PSG . PSG , PH₃가 가 FE (stream) . PSG 2 , (P₂O₅) . PSG 가 , , (getter) , 가 .

50) , PSG (L1) FE (, 3 .

(52) 10nm 40nm CVD .
 (wet) , .

700 900 가 . PSG
 (46) (48) 2 (42) . (52) (48)
 (52) .

, (56), (FE) (58) (60) . FE 54 ,
 (56) Pt Ir, Pt/Ir , (54) (52)
 20nm 100nm .

, FE (58) (CVD) . FE : Pb(Zr,Ti)O₃ (PZT), PLZT, SrBi₂Ta₂
 O₉ (SBT), Pb₅Ge₃O₁₁, BaTiO₃, LiNbO₃ .
 Pb₅Ge₃O₁₁, SBT PZT . FE PZT ,
 0nm 400nm FE (58)가 . PZT . 10

(60) FE . 20nm 200nm ,

42) . PSG(46) (52) (54) , ()
 L2 , L2 L1+2 ,

5 , 1 (62) 10nm 50nm TiO₂
 . n+ (64) n+ (66) 30keV 80keV 1.0
 $\times 10^{15} \text{ cm}^{-2}$ $1.0 \times 10^{16} \text{ cm}^{-2}$. 10 60 600 1000
 가 , (68) (70)
 PSG , 5 .

, 2 (72) CVD . (74), (76) (78)
 가 , 6 .

MFMS , MFAMOS . 7 ,
 MFMS (80) .

MFAMOS (40) , (SIMOX)
 , (82) , . 1 .

180keV n- p- , 30keV
 (82) , $5.0 \times 10^{11} \text{ cm}^{-2}$ $5.0 \times 10^{13} \text{ cm}^{-2}$, p- (84)
 . (85a,85b) .

keV, (82) 20nm 100nm n- (86) 5keV 40
 $5.0 \times 10^{11} \text{ cm}^{-2}$ $1.0 \times 10^{13} \text{ cm}^{-2}$
 MF MOS PSG (40) MFMS PSG
 300nm (PSG)가 . 300 500 , 100nm
 8) PSG . PSG . 20nm 50nm (8
 electric gate stack surround structure) , n- FE FE (ferro
 , n- (86) , PSG 100nm 300nm CVD
 , (L1) FE (90)
 7 가
 (88) , 10nm 40nm CVD
 , 8 , FE 94
 (96), (FE) (98) (100) . FE (94)
 (94) (82)
 L2 , L2 L1+2
 9 , 1 (102) 10nm 50nm TiO₂
 . n+ (104) n+ (106) 30keV 80keV
 $1.0 \times 10^{15} \text{ cm}^{-2}$ $1.0 \times 10^{16} \text{ cm}^{-2}$. PSG , 10 60
 , 600 1000 , 9 가
 , 20 100 , 500 700 가
 , 2 (112) CVD
 가 , 10 (114), (116) (118)

(57)

1.

p -

;

;

100nm 300nm , 300 500 CVD PSG
 ; 20nm 50nm PSG (FE) , ;
 (FE) (FE) ;

L1

FE

;

10nm

40nm

CVD

;

L2

가

FE

(L2 L1+2);

1

;

;

;

2

CVD

;

2.

1

, FE
 100nm 300nm

PSG

CVD

300 500
 ; 20nm 50nm

PSG

3.

2

PSG

10

60

600

1000

가

4.

1
 5keV

, FE
 40keV

, $5.0 \times 10^{11} \text{ cm}^{-2}$

$1.0 \times 10^{13} \text{ cm}^{-2}$

20nm

100nm n -

5.

4

20

100

500

700

가

6.

1 , FE 10nm 40nm ,
 100nm 400nm , 10nm 40nm

7.

6 , Pt, Ir, Pt/Ir

8.

6 , Pb(Zr,Ti)O₃ (PZT), PLZT, SrBi₂Ta₂O₉ (SBT), Pb₅Ge₃O₁₁ ,
 BaTiO₃ LiNbO₃ FE

9.

p- ;

, ;

CVD 100nm 300nm PSG PSG
 20nm 50nm

L1 , (FE) ;

(FE) , L2 , L2 L1+2 () , FE ;

FE 1 ;

1 2 ;

; FE ;

10.

9 , FE 100nm 300nm
 PSG PSG 20nm 50nm

11.

10 ,

12.

9 , FE 20nm 100nm n-

13.

9 , FE 10nm 40nm , 100nm 400nm
 , 10nm 40nm .

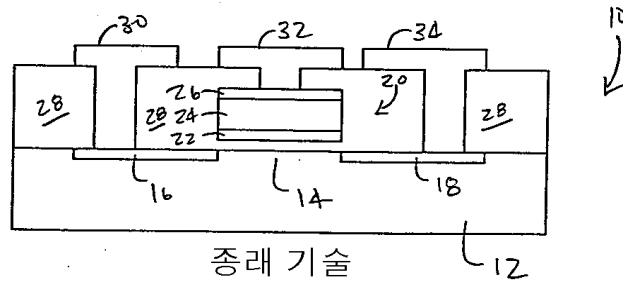
14.

13 , Pt, Ir Pt/Ir

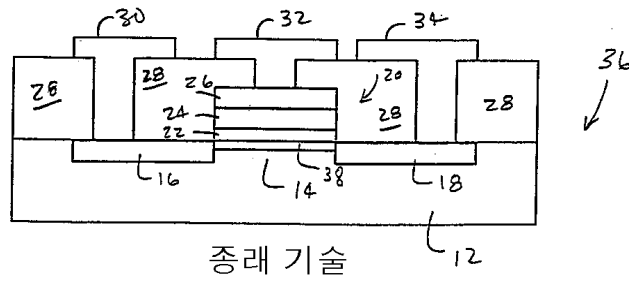
15.

13 , Pb(Zr,Ti)O₃ (PZT), PLZT, SrBi₂Ta₂O₉ (SBT), Pb₅Ge₃O₁₁, BaTiO₃ L
 iNbO₃

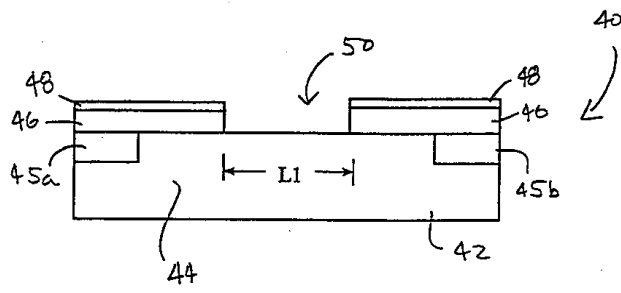
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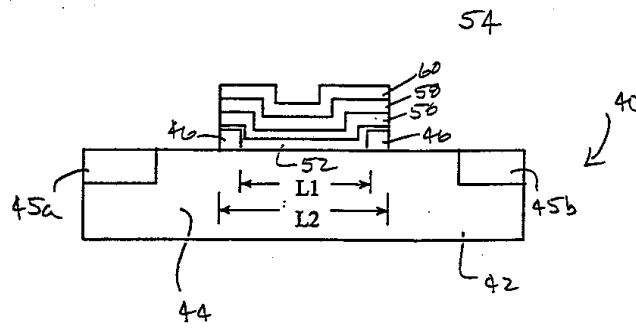
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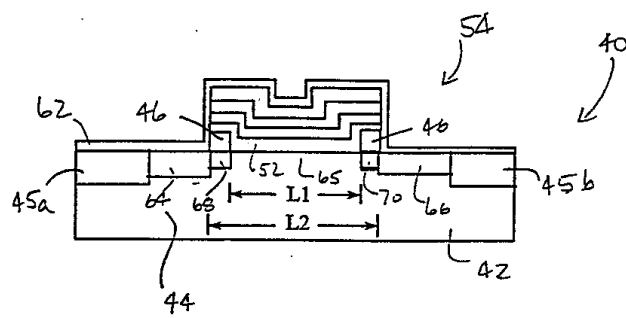
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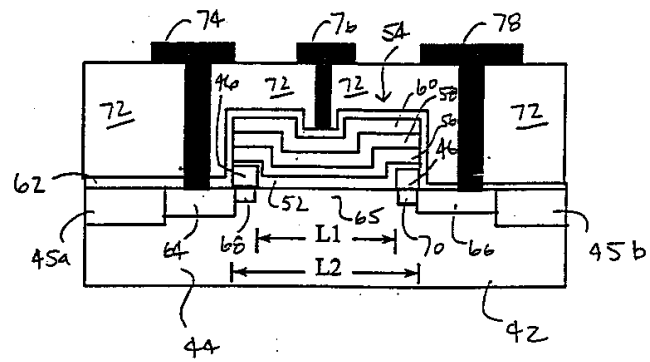
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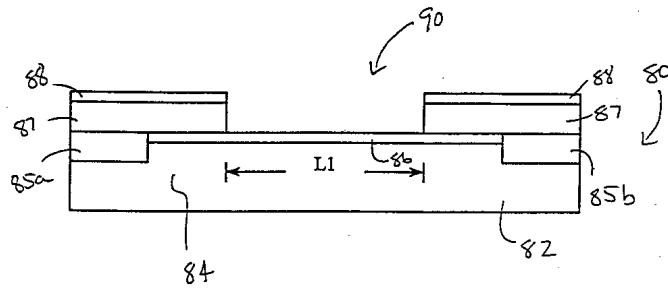
5



6



7



8

