

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

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(21) 10 - 1993 - 0007400 (65) 0000 - 0000000
(22) 1993 04 30 (43) 0000 00 00

(30) 07/877,287 1992 05 01 (US)

(73) .
75265 13500

(72) .
75243 2911 9350

(74) :
.

(54)

(28) , (20)
(32)(,
) .
, ,
, 가 1
(, 2 (40)
, (42) 2 (가) .
(34) , (32)

[]

[]

1 Ge .

2 Ge .

3 Ge .

4 Ge .

< >

10 : 12 :

14 : 16 :

18 : , 20 :

22 : 24 :

[]

, , MOS , , .

- SiO₂ (non - SiO₂)

가

. - SiO₂SiO₂- SiO₂

Si,

(High Dielectric Constant : HDC)

(

,)

가

,

(spontaneous polarization),

가

" (inert)"

,

(

)

,

,

,

,

,

가

(non - volatile, non - destructive read out, field effect memory)

(Ba,Mg)F₂

SiO₂

가

(grain boundary)

. Si

GaAs

Si

GaAs

. GaAs

Si

GaAs가

450 - 700

(),

3

가

가

GaAs

GaAs

, GaAs

(450 - 700)

GaAs가

GaAs

rmanium)

(non - ge

가 1

(gallium arsenide)

(

). 2

2

(

)

(barium strontium titanate)

SiO_2 , HDC (epitaxy) SiO_2 가, (SiO_2)
 SiO_2 ,
 (Si process technology)
 4% , 1 가 .
 Ge (, 가)
 (Ge).
 ($\text{Ba}_{1-x}\text{Sr}_x\text{TiO}_3$ (BST) , BaTiO_3 (BT) SrTiO_3 (ST)가 Si ,
 BT ST가 , BT ST , H_2 O_2 가 , BT ST , $\text{Pb}(\text{Ti,Zr})\text{O}$ (PZT) , SrTiO_3 ,
 GeO_2 가 , BT ST가 ,
 (SrTiO_3 (Perovskite) (Pyrochlore) BST , BST ,
 (100) BST (110) BST (100) Si ,
 SiO_2 가 (- - MFS) MOS / (remnant pol) ,
 MFS DRAM ,
 arization) MBE (Ba, Mg) F_2 , PZT ,
 가 ,
 SrTiO_3 , BaTiO_3 2 가 , RAM ,
 M 3 - 5 , GaAs , RA ,
 GaAs MFS ,
 1 가 (, , MOS ,
 1 (10) (12) ,
 (14) (

barium strontium titanate layer)(16) (18) (ferroelectric
(16) . , .

2 () (12) (20) (12) (22) (14),
(16), (24) (26) (22)
(14) (16) (24)

3 (30) (28) (28) (32) (Pb, Mg)
NbO₃ (34) (18) ()
, , , .
, 가 , , .

4 (28) (20) (32) 2 (40)
(32) (42) 2 (40) 2 . 2

가 (,)
, , ()
, , (TiO) (TaO₅),
(, ,)
, 가
, ()
, (non - reactive manner)

/ / / /

(,) 가
 , " , " , 가 ,
 00 가 . , " " 100 , , 1,0
 (10,000 가).
 BaTiO_3 , $(\text{Bs}, \text{Sr}, \text{Ca})(\text{Ti}, \text{Zr}, \text{Hf})\text{O}_3$
 $(\text{K}, \text{Na}, \text{Li})(\text{Ta}, \text{Nb})\text{O}_3$, $(\text{Pb}, \text{La})\text{ZrTiO}_3$, $(\text{Pb}, \text{Mg})\text{NbO}_3$, $\text{Bi}_4\text{Ti}_3\text{O}_{12}$
 . Al, Mg, Mn, Na , La, Nb,
 P - (non - germanium) 가 GaAs
 . , " " " - " .

(57)

1.

,
 (a high - dielectric constant oxide)

2.

1 , .

3.

1 , - (non - single crystal) , ,
 / , - .

4.

1 , 가 1 .

5.

, , .

6.

5 , .

7.

5 , .

8.

7 , 가 1 .

9.

5 , (gallium arsenide) .

10.

5 , 2 .

11.

10 , 2 .

12.

10 , 2 .

13.

12 , 2 .

14.

5 , (titanate) .

15.

14 , (barium strontium titanate) .

16.

14 , (lead - containing) ,
(non - lead - containing) .

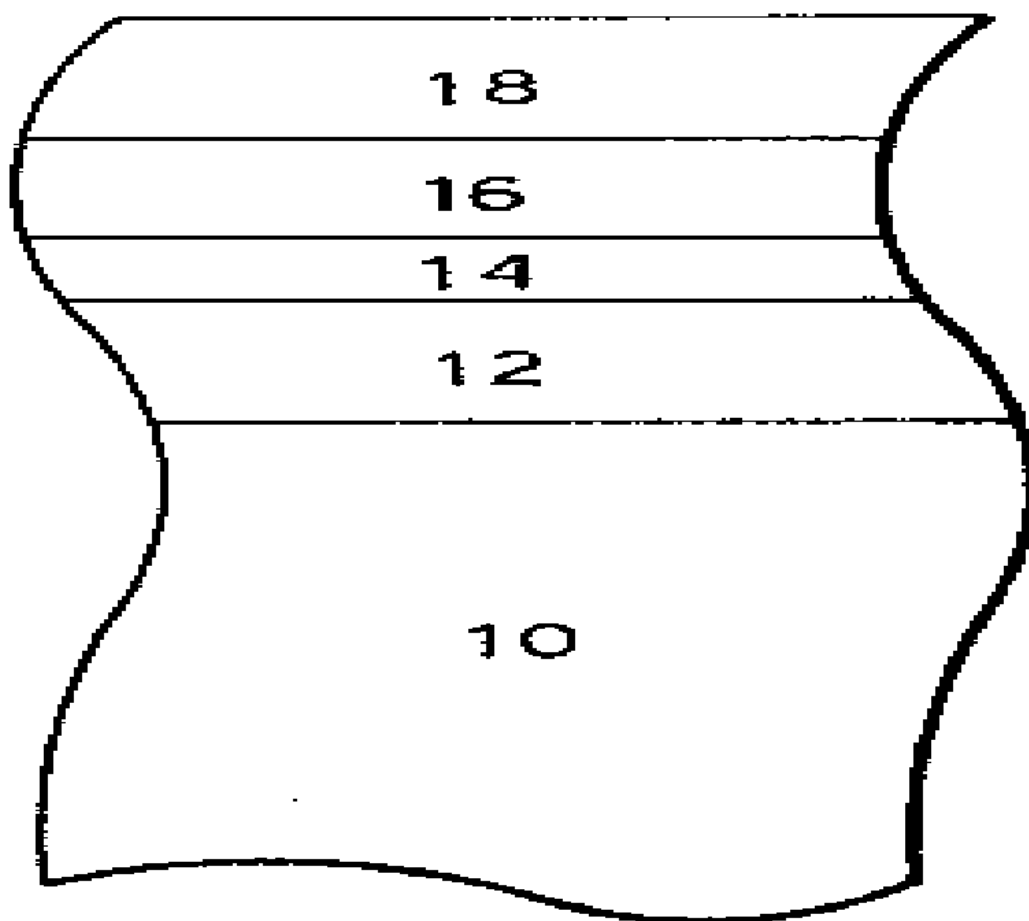
17.

5 , - , , /
, - .

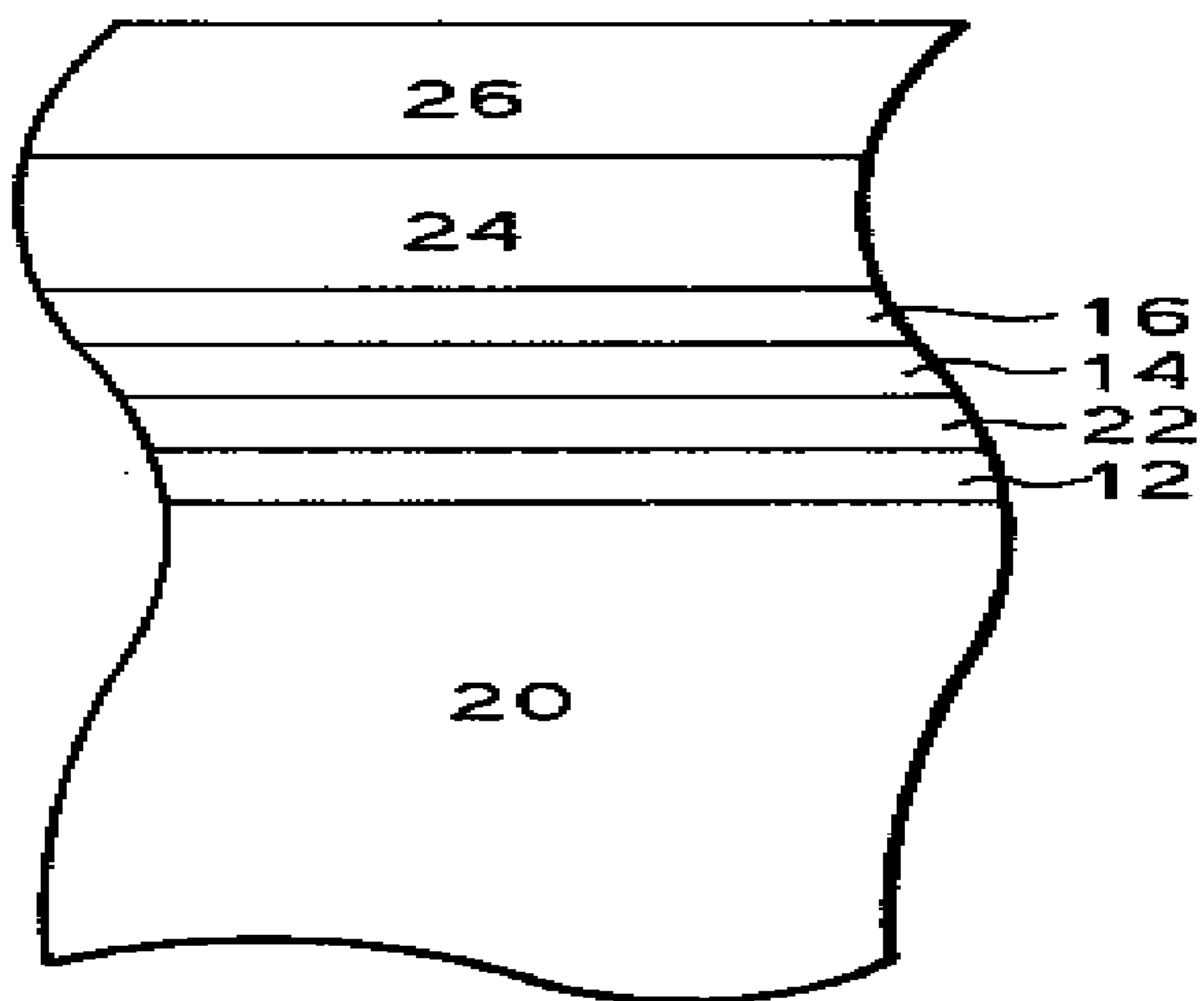
18.

1 , .

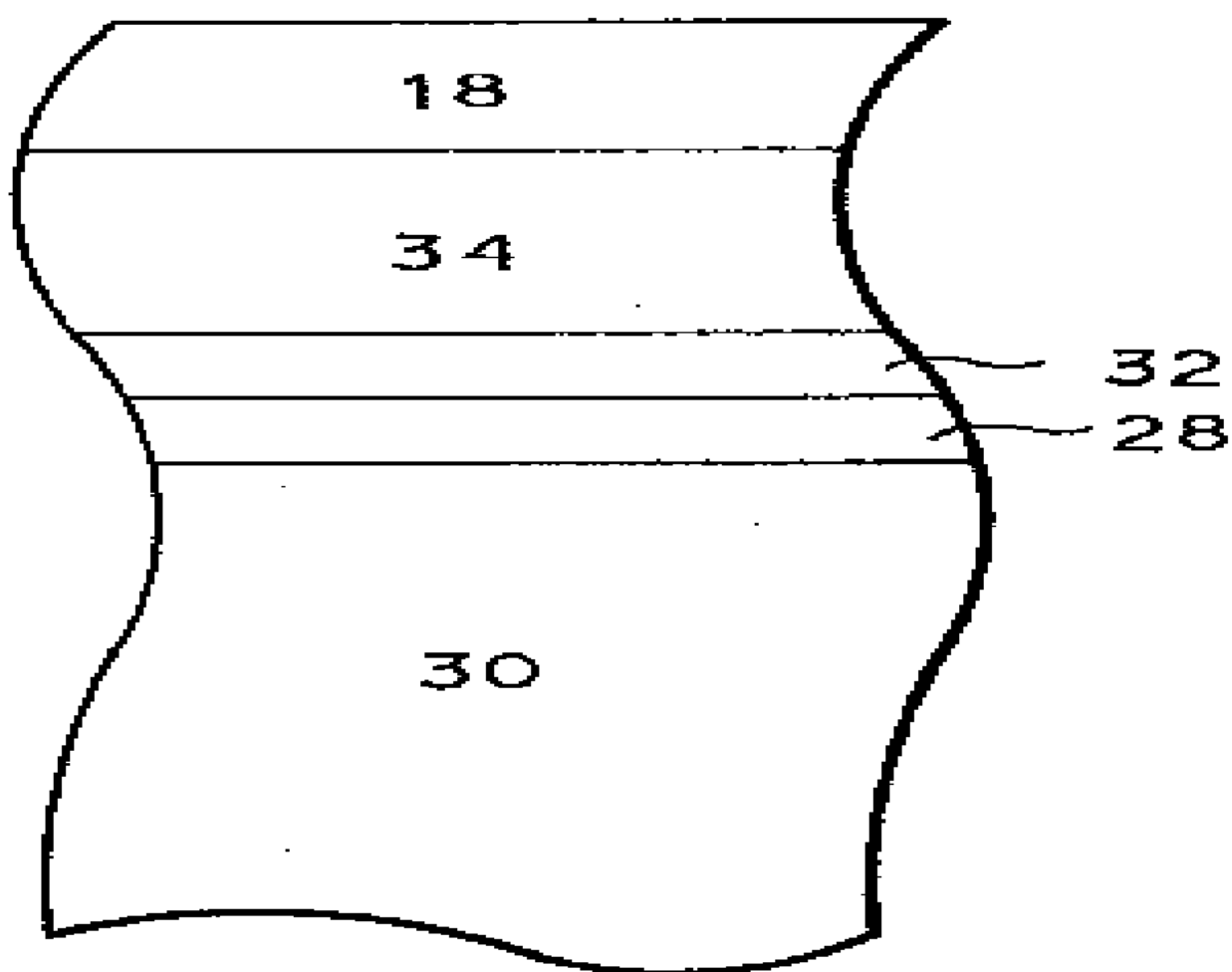
1



2



3



4

