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(71), 60196, , 1303

(72), 78757, , 7608

, 78664, , 3016

(74)

:

(54) M I M

MIM(metal-insulator-metal)									
40)	1	1	(30)	(30, 40)	1	가	(10)	(20)	(
.	(50)	1		(30, 40)	1	(30)	(30, 40)	(20)	
eriphery)	1		(30, 40)	.	2	(40)	(65)가	(50)	(p)

MIM(metal-in
sulator-metal)

(
olysilicon) , , , 가
) (back-end) (MIM
. (copper) 가 (post-metal)) , , (p
RF , , ,
가
(, (copper diffusion))

가 ,
MIM

1 MIM
2 1 1
3 1 2
4 (recess) 1 3
5 2 4
6 MIM (bottom electrode) 2
5
7 , 3 , (etch stop layer)
6
8 1 7

9 MIM (top electrode) 3
 8 .
 10 . 2
 9 .
 11 MIM (conductive via)
 10 .

MIM 가 , , 20
 , , ,
 , , ,
 가 , ,
 (50) (30) (40) (40) (200) MIM (205) 가
 MIM (40) , , (30) (hafnium) , ,
 , , ,
 , , ,
 가 , ,
 , , ,
 1 11 MIM (10) (20) , ,
 (10) , , (10) (MOS) / (SOI)
 , , ,
 , , ,
 (20) (CVD), (PVD) , ,
 , , ,
 2 , , (20) (trench) PVD, CVD, (recess) (200)
 , , 1 (30) (20) , , (electroplating)
 1 , (30) PVD, CVD, , ,
 , 1 (30) (atomic layer deposition)(ALD), , ,
 , , ,
 (lined). , ,
 , , ,
 3 (damascene structure) 1 (30) (30) 1 (30) 1 (30) 1 (30)
 - (etch-back) , , (slotting) , , (dis

ESL (70) 70)	PVD, CVD, ALD, (ILD)	, ESL (70) (antireflective coating)	ESL (70)	, ESL (60)
ESL (70) 70)	10	,	,	
,	(50), 3 (50), 3	(60), 3 (60)	ESL (70) (60) ESL (70)	
8 ESL (70)	가 1 3 1	(60) (80)	ESL (70) (80)	3 (65)(60) 2 (65)) 9
10 ILD(90)	가 , ILD(90) 가 1 ()	(10) ESL (75)	2 11	(100) (110)
ILD	가 ILD 가 (50)	가 , ESL (75) (65) 가	1	(40) ESL 1
,	(50) ESL (75)	,	2	
,	(chamber)	,		
11	가 , 가 (110)	, 가 (65)	가 ,	(110)
11	MIM			1
가	가 , 가 ,	가 (>1GHz) (40) 가	가 ,	MIM (on-chip) (40)
5) 1 (40) (40) 1 (60)	1 (30)	1 (30)	(40) MIM (40) (40)	(65) 1 (30) 1 (30) ESL (70) (50) 3
,	,	,	, ILD (90) (50)	,
,	IC			
가 MIM				가

(non-exclusive)

가

MIM

가

(57)

1.

MIM(metal-insulator-metal)

(10)

;

(10)

(20)

;

(20)

(205)

;

1

(30)

,

1

,

;

1

(30)

;

1

(30)

2

(40)

(conductive oxidation barrier)

,

2

(40)

1

(30)

2

(40)

(50)

;

(50)

3

(60)

,

.

2.

1

,

1

(30)

:

(20)

1

(30)

;

(damascene structure)

1

(30)

,

3.

1

,

2

(40)

50 2000

2

(40)

,

4.

1

,

2

(40)

:

(20)

1

(30)

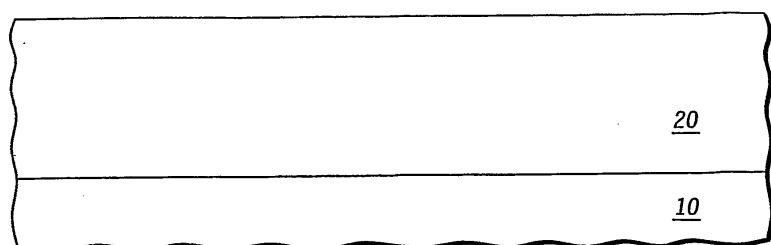
2

(40)

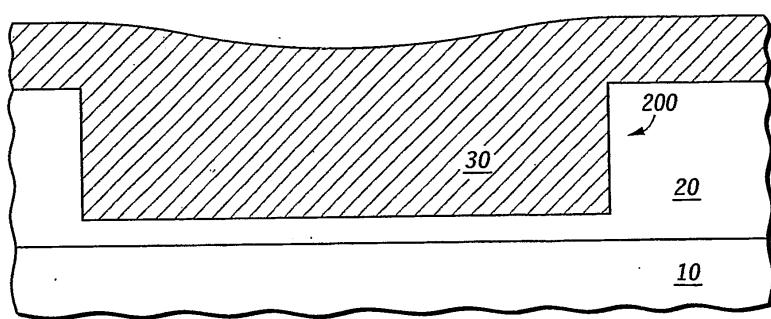
;

1 (30) (periphery)
 1 (30) (205) ;
 (20) ;
 2 (40)
 2 (40) ;
 - (self-align);
 ,
 5.
 ,
 (10) ;
 (10) 1 (20) ;
 1 (20) (205) ;
 (205) 1 (30) , 1 (30) , ;
 1 (30) ;
 1 (30) 2 (40) , , 2 (40) 1 (30)
 1

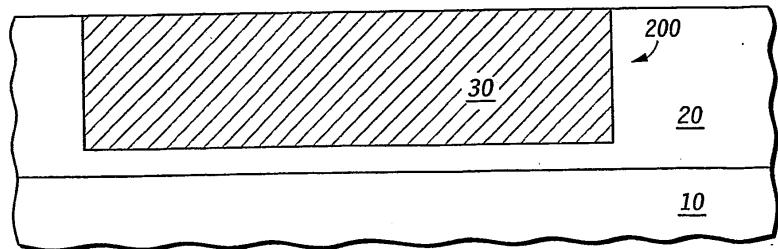
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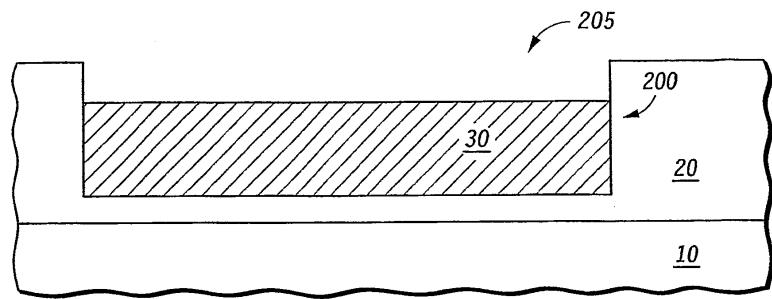
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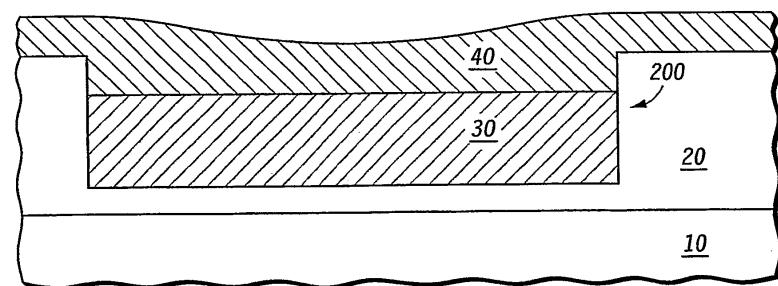
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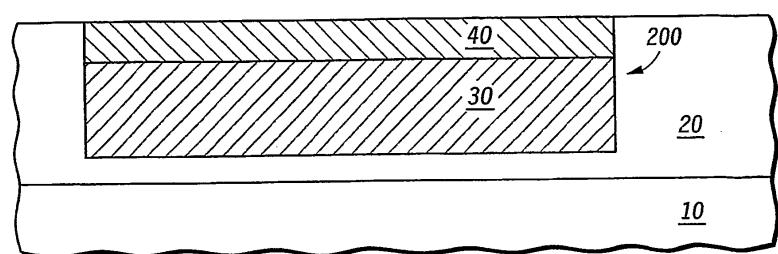
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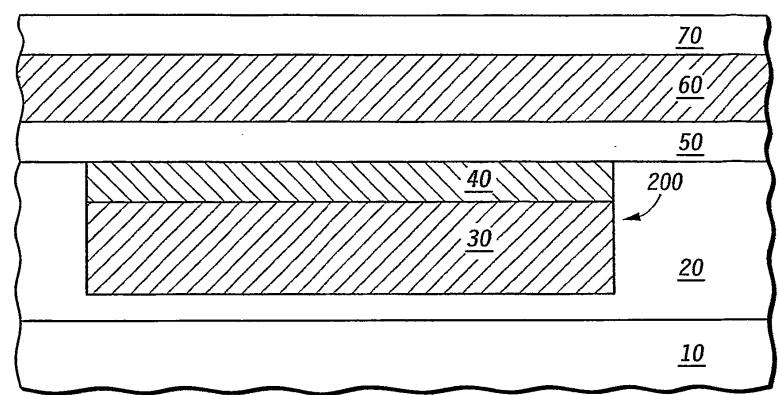
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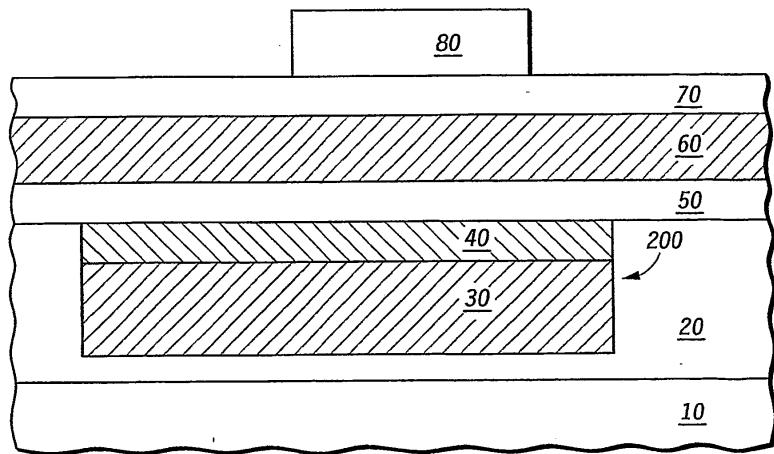
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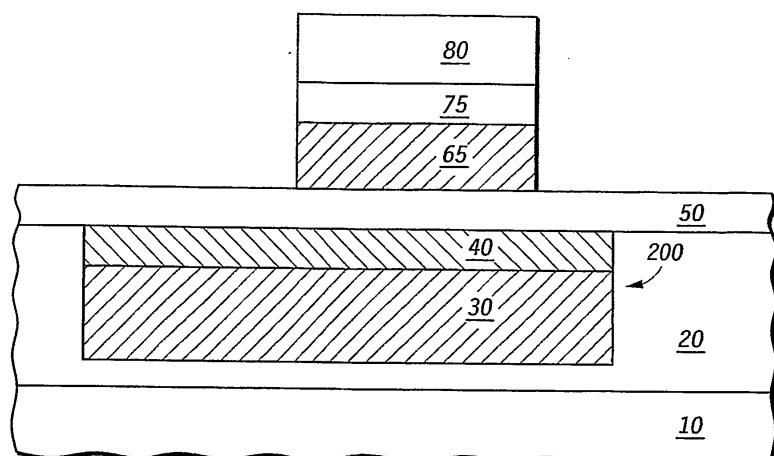
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8



9



10

