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(KR)
(A)

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2004 03 11

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(JP)

(71)

가 가

가 22 22

(72)

가 가 2-5-4

5-7-1

(74)

:

(54)

가 , 가 (cross nicole)
(quenching pattern) 가
가 가
Vmax [V] , d/p , 0.0021×(Vmax)² - 0.0458×(Vmax)+0.65 , 0.0021×(Vmax)² - 0.0458×(Vmax)+0.50 , d · Δn/λ , - 0.00026×(Vmax)³ + 0.016×(Vmax)² - 0.2281×(Vmax)+2.124 , - 0.00026×(Vmax)³ + 0.016×(Vmax)² - 0.2281×(Vmax)+1.7603 .

1

1 , d/p d · Δn/λ

2			,	가	
3					
4		(ON)	,	가	,
5			,	가	,
6			,		가
7			,		가
8			,		
9	가		,		
10			,	가	
11			, ON		
12			,		
13	가	10 [V]	,	d/p	$d \cdot \Delta n / \lambda$
14	가	6 [V]	,	d/p	$d \cdot \Delta n / \lambda$
15	가	4 [V]	,	d/p	$d \cdot \Delta n / \lambda$
16	p=0		,		
17	p=0		,		
18	p=0		,		
19	p=0		,		
20	d/p=0.13		,		
21	d/p=0.13		,		
22	d/p=0.13		,		

23	d/p=0.13	,	.
24	d/p=0.38	,	.
25	d/p=0.38	,	.
26	d/p=0.38	,	.
27	d/p=0.38	,	.
28	d/p=0.48	,	.
29	d/p=0.48	,	.
30	d/p=0.48	,	.
31	d/p=0.48	,	.
32	,	,	.
33	,	,	.
34	가	가	.
35	,	,	.
36	가	,	가
37	,	d/p	.
38	,	d · Δn/λ	.
39	,	.	.
40	,	.	.
41	,	.	.
42	,	.	.
43	,	.	.
44	,	.	.
45	,	.	.
46	,	.	.

47

48 가

49 가

50 가 , 가 ,

< >

11, 21 12

22 23

100 TFT 101, 102

, , , TN(Twisted Nematic) , 가 , 가 , 2000-472 51 (: 2000 2 18 ; ,) 6,384,889 (Date of Patent : 2002 5 7) , VA(Vertically Alignment) 가

VA , 가 , 가 ,

, 가 , 가 , , 가 ,

, 가 , , ,

2000-47251 , [0039] , 6,384,889 EXAMPLE7 (가 18 [μm] , 4 , 90 ° 가 , ,

(100b) 1 2 (30) TFT (100a) (100b)

(30) , 가 (30) d/p가 가 (30)

$d \cdot \Delta n / \lambda$, 가

(30) (30a) , TFT (100a) (100b) (30) (30a)

(13, 23) (30) 가 2 (30)

(13, 23)

(30) (30a) , (13, 23) 가 , (30a) (「

(13, 23) (「

(30a)가, (13, 23) 85 ° 90 °

(100) TFT (100a) , () (11) , (1) (1

2) , TFT (100a) (30) (13) , (100b) (30)

() (21) , (2) (22) , (100b) (30)

(23) (12) (22) 가 (30) 가

(30)

「 」가 1 「 」

, R, G, B 「 」가 1 「 」

가

(100) (100a) 1 (

(12) , (ITO) (12) , , (12a)가 , 3 ,

(100) () , 2 3 1B-1B' (12a) ,

(12a) (12b) , (12a) ,

(12)

(12a) , 4 (12a) , 1 (solid

section; 「 () , , (12c) , 4 (12a) 4 4 1

A , 3 (12) (12a) 2 1()

(12a) 4 1()

(12) (12a), (12c) , 1

4 (12a) , (12c) ,

(12a) (12c) , ,

(12c) , (12b)가

(12) (22) 가 , (12a)

(12a) , (12c) , 1 .

(100) , (12) (22) (30) 가
) , 2 , (30a) , (100a, 100b)

(30) 가 , 4 EQ , (30) , (30) EQ()
가 , (12b) (22) (12)

(12a) , (12a) (12a) (12b)) EG , (30) , (12a)

(EQ (12a) , , 가 .

(, (30a) , (30a) EQ
()) 가 , EG (30a) ,
EG 4 , () . (30) (30a) , 5
(12c) (12a) EQ
, 4 , (30) 가 , (30a) (ON)
, 5 가 (30a)

, 6 (30a) , (30a) EQ
가 , (30a) 가
(30a) , (30a)가 , (30) 가
가

, EQ ()가 , 7 , (30a) (30a) ,
EQ EQ ()

, (30a) EQ 가
(30a) , 8 EQ (30a) , 9
() , EQ가 EQ 가 가 , EQ
(30a) , EQ (30a) , EQ
EQ EQ (30a) EQ
EQ (30a) , (12b) (12a)

, (12a) (30a) , (12a)
EG (30a) , EQ 5 (12a) ,
(30a) , 가 EG (30a) , (12a)
SA

가 , (12a) (12a) EG (12c) , (12c)
(12c) (30a) , (12c) (30a) , EG
(30a) (12c) (12c) (30a) ,
(12c) SB((12a)가)

, , EQ (30a) 가
, (30a)가 , 5

(30) 가 (30) , 10 12 (30a) ,
 (13, 23) , 10 (30a) ,
 (30a) , (12a) (12) 가 (30a)가 ,
 (30) 가 , 4 EQ EQ 가 ,
 (30a) (30a) , 가 EQ EQ 가 (30a) , (30a)가 (,
) , (30a) , EQ (30a) , ()
 , 가 , 11 E
 Q (30a) , , (12a) EG (30a)가
 (30a) , (12a) EG (30a) ,
 (30a)가 , 12 p , , ,
 , 가 , (12a) EG (12a) (30a)가 (30a) ,
 가 , EG (30a) , (12a) SA (30a) ,
 , (12a) SA (30a) , (12a) SA (30a) ,
 (30a) , (30a) , ()
 , (100) ((100a, 100b)) , (3
 0a) , (12a) , , , ,
 , (30) (30a)가 , , , ,
 가 , (12c) , , , (30a) , (12a) (,
 30a)가 EG (30a) , , , 가
 , EG (30a) (12c) SB ,
 , 가 , (12a) SA (30a) ,
 , (30a) , (12c) SB (30a) ,
 (30a) , () , , ,
 , 가 , (30) , (12) (12a) , (12)
 , (30) (12) 가 , EQ 가 (30a) (12a) (12b)
 , (30) 가 , , , ,
 , (12c) , (12a) EG (30a) (12a)
 , (12a) , (30a) , ((100b))
 , (12c) (30a) ((100a))
 , (12a) (12c) (disclination) ()
 , , , ,
 , , (30a)가
 , (30a) , , , ,

Figure 1 is a schematic diagram of a semiconductor device 100. The device 100 includes a substrate 110, a gate insulating layer 120, a gate electrode 130, a source/drain region 140, and a contact pad 150. The gate insulating layer 120 is formed on the substrate 110. The gate electrode 130 is formed on the gate insulating layer 120. The source/drain region 140 is formed in the substrate 110, and is electrically connected to the gate electrode 130. The contact pad 150 is formed on the source/drain region 140, and is electrically connected to the source/drain region 140. The device 100 is a semiconductor device, and is used for various applications.

$$\begin{aligned} & \frac{d}{p}(\min) \leq \frac{d}{p} \leq \frac{d}{p}(\max) \\ \text{단, } & \frac{d}{p}(\max) = 0.0021 \times (V_{\max})^2 - 0.0458 \times (V_{\max}) + 0.65 \\ & \frac{d}{p}(\min) = 0.0021 \times (V_{\max})^2 - 0.0458 \times (V_{\max}) + 0.50 \end{aligned}$$

$$d \text{ [}\mu\text{m]} = \frac{a}{\sin \theta} \quad (100)$$

$$p \text{ [}\mu\text{m]} = \frac{a}{\sin \theta} \quad (100)$$

$$d \cdot \Delta n / \lambda = \frac{a}{\sin \theta} \cdot \Delta n / \lambda \quad (100)$$

$$V_{\max} = \frac{a}{\sin \theta} \cdot \Delta n / \lambda \quad (100)$$

2

$$d \cdot \Delta n / \lambda \text{ (min)} \leq d \cdot \Delta n / \lambda \leq d \cdot \Delta n / \lambda \text{ (max)}$$

단, $d \cdot \Delta n / \lambda \text{ (max)} = -0.00026 \times (V_{\text{max}})^3$
 $+0.016 \times (V_{\text{max}})^2$
 $-0.2281 \times (V_{\text{max}}) + 2.124$
 $d \cdot \Delta n / \lambda \text{ (min)} = -0.00026 \times (V_{\text{max}})^3$
 $+0.016 \times (V_{\text{max}})^2$
 $-0.2281 \times (V_{\text{max}}) + 1.7603$

d/p , Δn , λ [μm] 1 가

V_{max} , d/p , $d \cdot \Delta n / \lambda$, 1 2 가

가, 가, 가

V_{max} , d/p , 1 2, 가

가, $d \cdot \Delta n / \lambda$, 1

가, 10 [V], d/p

$d \cdot \Delta n / \lambda$, 13, 가, $d/p=0.38$, $d \cdot \Delta n / \lambda$

λ , 가, 14, 가, 6 [V], d/p , $d \cdot \Delta n / \lambda$

$d \cdot \Delta n / \lambda$, 15, 가, 4 [V], d/p , $d \cdot \Delta n / \lambda = 1.10$

.31, 가, $d/p=0.38$, $d \cdot \Delta n / \lambda = 1$

가, $d \cdot \Delta n / \lambda$, ()

가, Erickson-Leslie, Jones matrix, 3

$V_{\text{max}}=6$ [V], $d/p=0.13, 0.38, 0.48$

(22), (30), (12), (30a)

16, 31, d/p , $d \cdot \Delta n / \lambda$, 가

K11/K33, -2.5, -6.5, $\Delta \varepsilon$, 0.9, 2.0

(30), $\Delta \varepsilon = -4$, 13, 31, K33/K11=1.1

16, 18, (22), 가, (30)

(30a)가, (101, 102), (30a)가

19, 가

$d/p=0.13$, 20, 23, (22), (30)

(12), (30a), 2, (30)

(12c))

23, 가, 가

(30), 가

$d/p=0.38$, 24, 26, (22), (30)

(12), (30a), $d/p=0.13$

27, 가

가

가, $d/p=0.48$ (22)

(30) 가 (12) (30a) 27 30

가 31

가

가 V_{max} d/p 가 d

$\Delta n/\lambda$ 가 (100) d/p , $d \cdot \Delta n/\lambda$ 가 V_{max}

가 V_{max} 2 3 1 2

d/p $d \cdot \Delta n/\lambda$ 1 2 가

가

가

2 (101, 102) (100)

가

(100) (30) (3

0a) 가

(30) 90° (100)

(30a) 가 (100)

(30) 90°

가 (30a) 가 EQ

A1, 32 EG

(100a, 100b) EQ가 (30) dx 33

(30a)가

(100a, 100b) (30) 가 (30a)

(13, 23) (13, 23) (30a) 34 dz

(30a) 가

34 가 (30a) dx, dy dz (30a) dx, dy dz, $dx=dy+2dz$

(30) 가

(100) 가 p가 (30a) (30a)

(30) dx 35

36 dz (30a) 가

(30a) 가 dx가 dz dy (30a) dx, dy dz, $dx=dy+2dz$

(101, 102) (30) , 가
 (,), , d/p=0.25 , dy
 (dy)가 dx , Vmax=6 [V] , d/p=0.3
 8 , 0.25 .

(30a) (dz) , 가
 , 가 dy 가 .
 , 가 1 2 , 가 (30) Vmax dx
 (30a)가 , 32 A1, , (30a)가
 , , , .
 , 1 2 , ,
 , 가 , 가 가 , ,
 , 1 2 , 3 ,

$$\begin{aligned}
 & d \cdot \Delta n / \lambda \text{ (min)} \leq d \cdot \Delta n / \lambda \leq d \cdot \Delta n / \lambda \text{ (max)} \\
 & \text{단, } d \cdot \Delta n / \lambda \text{ (max)} = -0.00026 \times (V_{\max})^3 \\
 & \quad + 0.016 \times (V_{\max})^2 \\
 & \quad - 0.2281 \times (V_{\max}) + 2.041 \\
 & d \cdot \Delta n / \lambda \text{ (min)} = -0.00026 \times (V_{\max})^3 \\
 & \quad + 0.016 \times (V_{\max})^2 \\
 & \quad - 0.2281 \times (V_{\max}) + 1.891
 \end{aligned}$$

, d · Δn/λ 37 , 가
 d · Δn/λ (max) d · Δn/λ (min)
 .
 가 , 1 2 , 4 ,

$$\begin{aligned}
 & d/p(\text{min}) \leq d/p \leq d/p(\text{max}) \\
 & \text{단, } d/p(\text{max}) = 0.0021 \times (V_{\max})^2 - 0.0458 \times (V_{\max}) + 0.63 \\
 & d/p(\text{min}) = 0.0021 \times (V_{\max})^2 - 0.0458 \times (V_{\max}) + 0.53
 \end{aligned}$$

, 가
 , d/p 38 d/p(max) d/p(min)
 .
 , 1 2 , 3 4 ,
 , 가

, 3 (12a)가 (12a) (12c)가 가
 , (12a) (12c) , ,
 .
 , 39 40 , 3 (12a) (12c)가 (12c)
 (12a) (12a) (12c) , 2
 (4) . (12a) (12c) , (12a)
 (12a) (12c) , 3 가
 , 가 ,
 , 41 42 (12c)가 (12a)
 가 42 (12c) 가 (12a)
 , (12c) (12a)
 (12c) , (12a) 3 가 , 가 ,
 , 3, 39 40 (12a) () (12c) ,
 (30a) () (12a) / (12c) ,
 (30a) , 43 (12a) 4 (12c)
 , 44 (12a) (12c) 4 가 , (12a)
 , (12c) (4 가) , 39 40 (2 가) (30a)
 (12c) 2 (12a) () , 3, 39 40 가 ,
 () ,
 , (12a) , (12c)
 , () (12a)
 a) (12c) 가 - , 3 (12) (12) 가
 (12c) 가 - 45 가 46
 - 47 , (12a) (12c)가 , 가 -
 , 45 , 3 (12c)가 가 - (12a) (2 1 4 1)
 , 가 , 가 ,
 , 3 (12) , 3 가 - (45)
 , 가 -
 가 - (12a)
 (12) () , (12c) ()
 (12b)()
 , (12a) 가 , (12b) 가
 , (12a) , (12a) 가 , (12b)

[illegible]

1 가 . ()

가 가 , d/p $\frac{\Delta \varepsilon}{d \cdot \Delta n / \lambda}$ -2.5 -6.5 , K11/K33 0.9 2.0

1 , 1 가 1

가 가 , 가 .

가

가 가

(57)

1. 1 2 ,

1 1 ,

2 , 1 2 ,

1 2 가 ,

1 2 가 ,

가 $\frac{d}{V_{\max} [V]}$, p $\frac{d/p,}{\Delta n}$ 1 2 가

$d/p = 0.0021 \times (V_{\max})^2 - 0.0458 \times (V_{\max}) + 0.65$, $0.0021 \times (V_{\max})^2 - 0.0458 \times (V_{\max}) + 0.50$

$d \cdot \Delta n / \lambda = -0.00026 \times (V_{\max})^3 + 0.016 \times (V_{\max})^2 - 0.2281 \times (V_{\max}) + 2.124$, $-0.00026 \times (V_{\max})^3 + 0.016 \times (V_{\max})^2 - 0.2281 \times (V_{\max}) + 1.7603$

2. 1 ,

$d \cdot \Delta n / \lambda = -0.00026 \times (V_{\max})^3 + 0.016 \times (V_{\max})^2 - 0.2281 \times (V_{\max}) + 2.041$, $-0.00026 \times (V_{\max})^3 + 0.016 \times (V_{\max})^2 - 0.2281 \times (V_{\max}) + 1.891$

3.

1 ,
d/p 0.0021×(Vmax) 2 -0.0458×(Vmax)+0.63 , 0.0021×(Vmax) 2 -0.0458×(Vmax)+0.53 .

4.

1 ,
 , 1 2 ,
 , 가 가 1 .

5.

1 ,
 1 2 ,
 1 가 , 1 2 가 ,
 .

6.

5 ,
 , , ,
 , , .

7.

6 ,
 , , ,
 가 .

8.

6 ,
 1 .

9.

6 ,
 1 .

10.

6 ,
 1 .

11.

6 ,
 1 가 .

12.

6 ,

가,

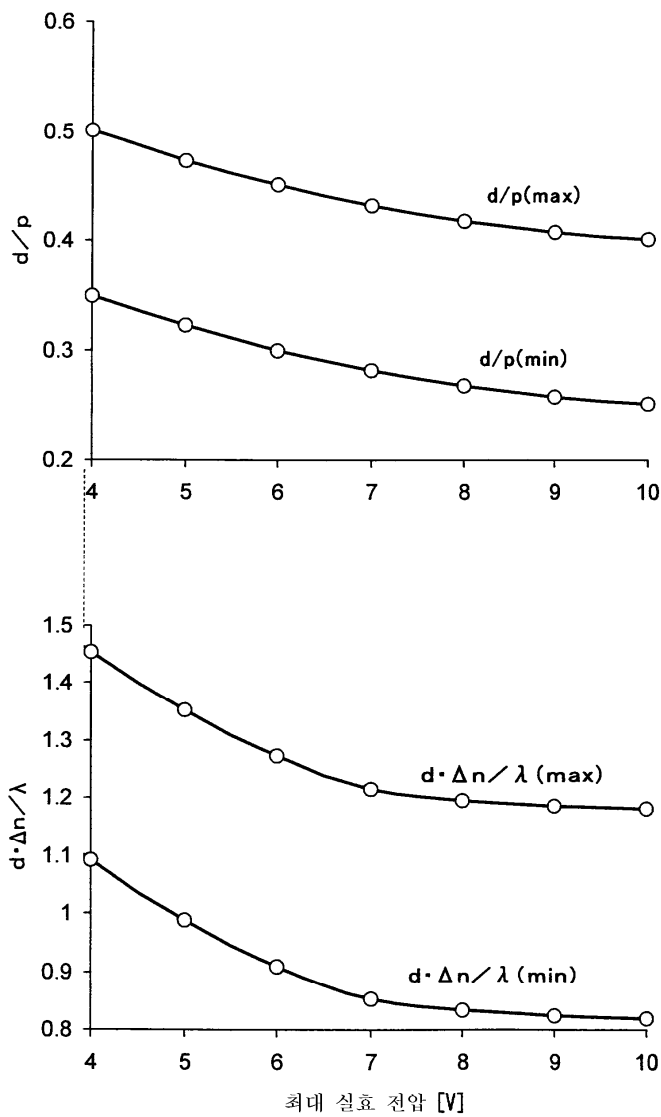
13.

1 , , $\Delta \varepsilon$ -2.5 -6.5 , K11/K33 0.9 2.0

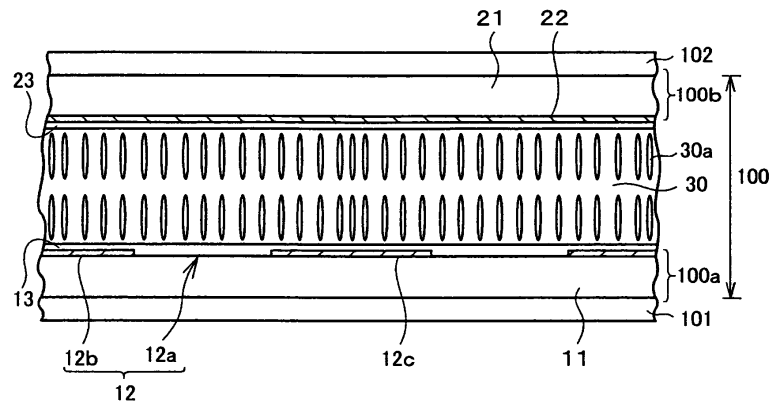
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1 , 1 , 1 , 1 가

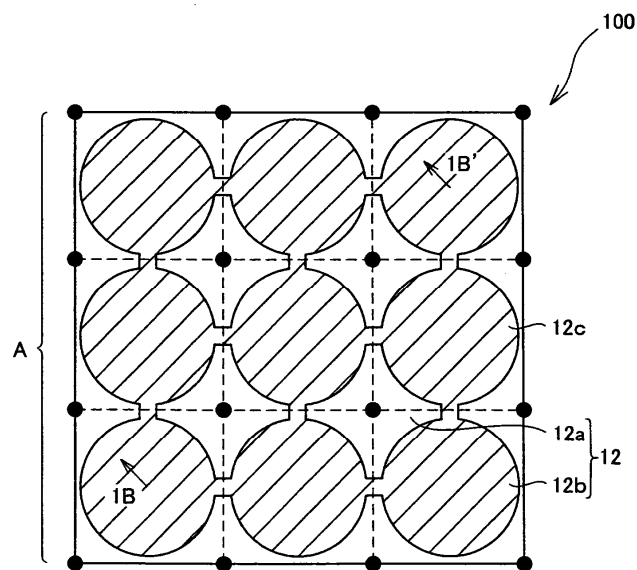
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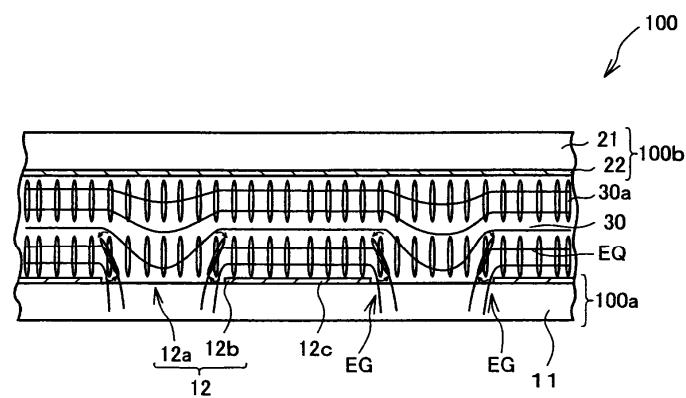
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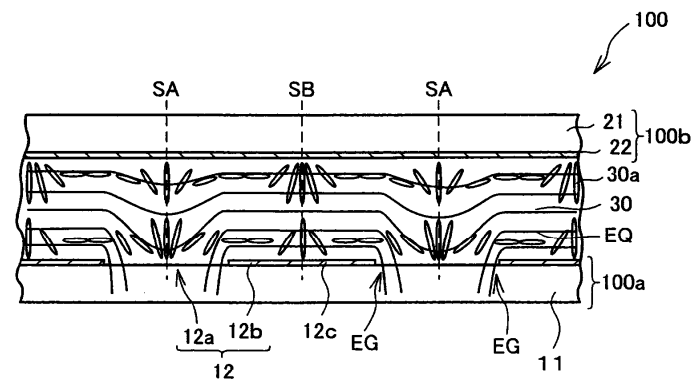
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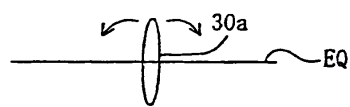
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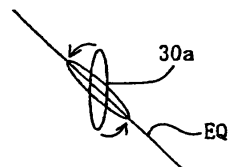
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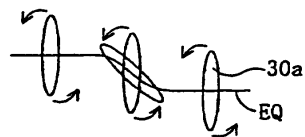
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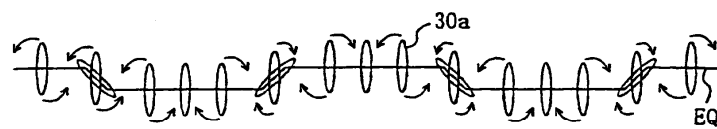
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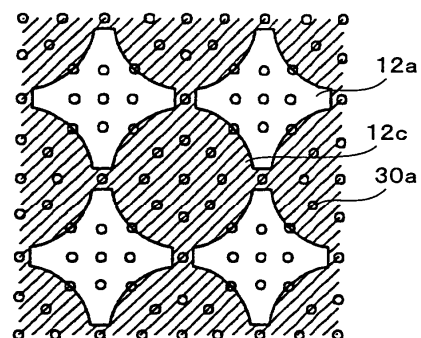
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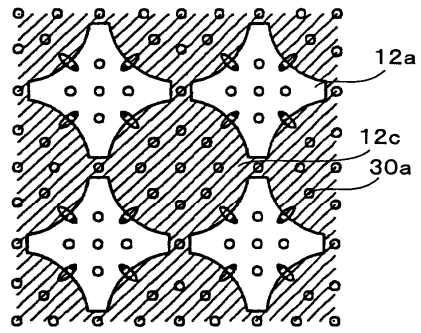
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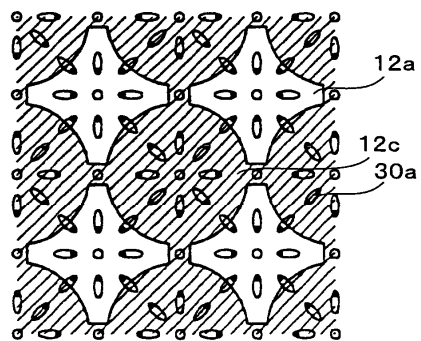
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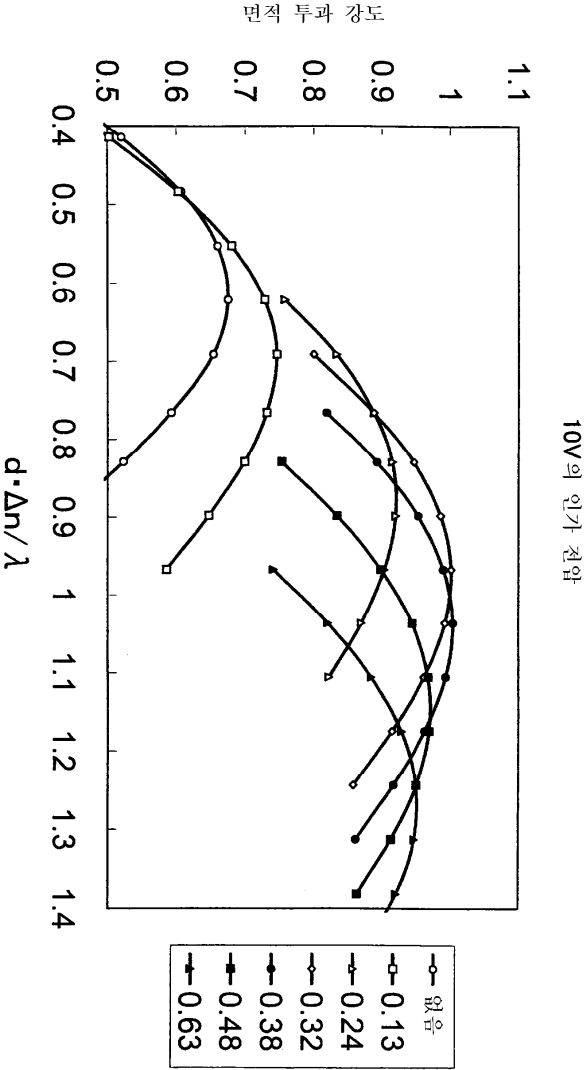
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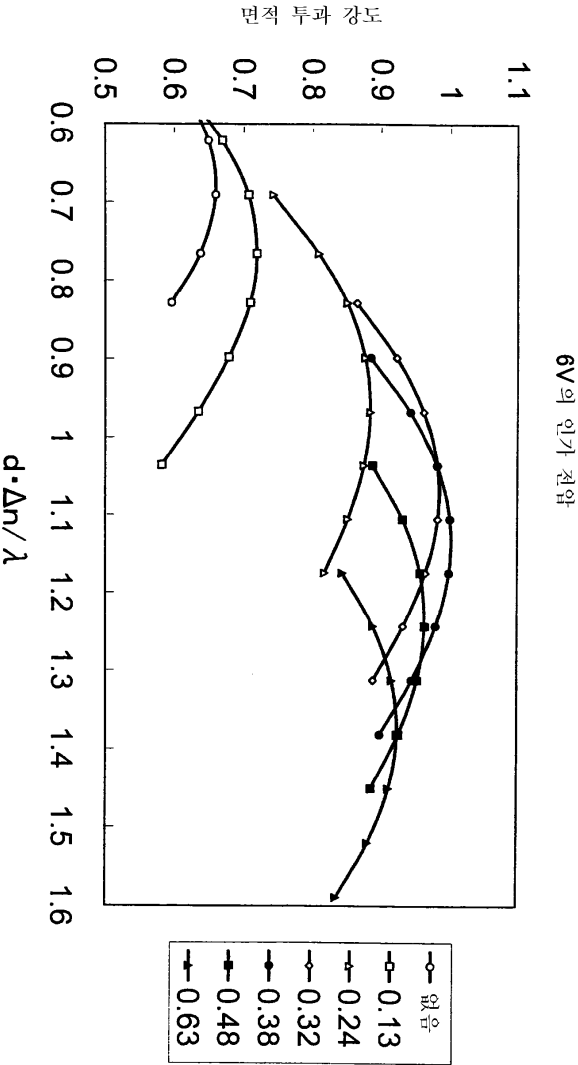
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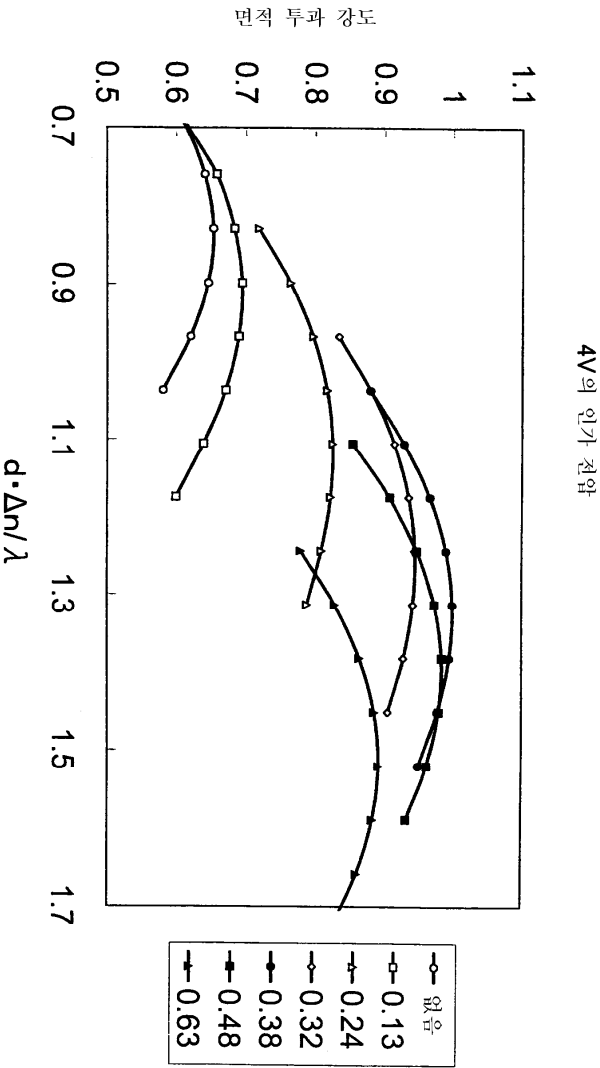
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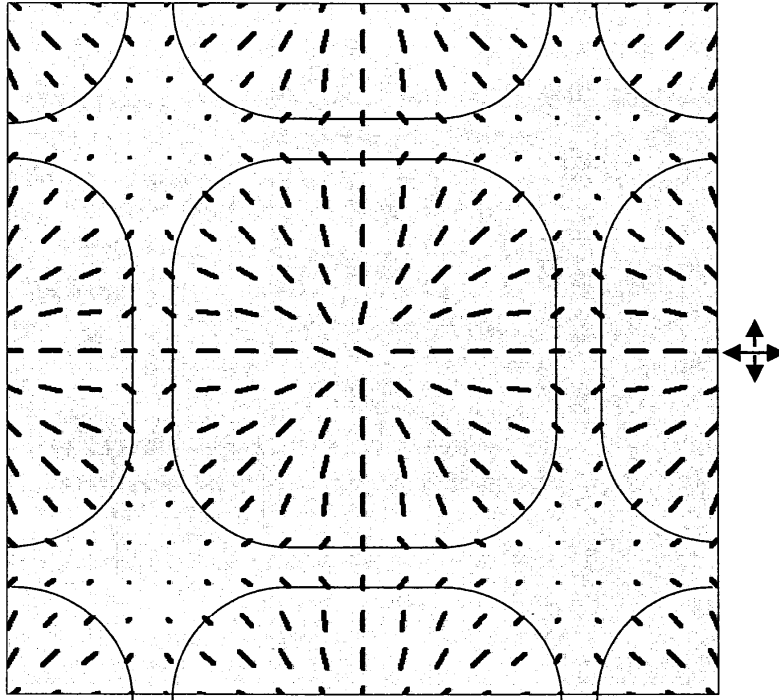
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15

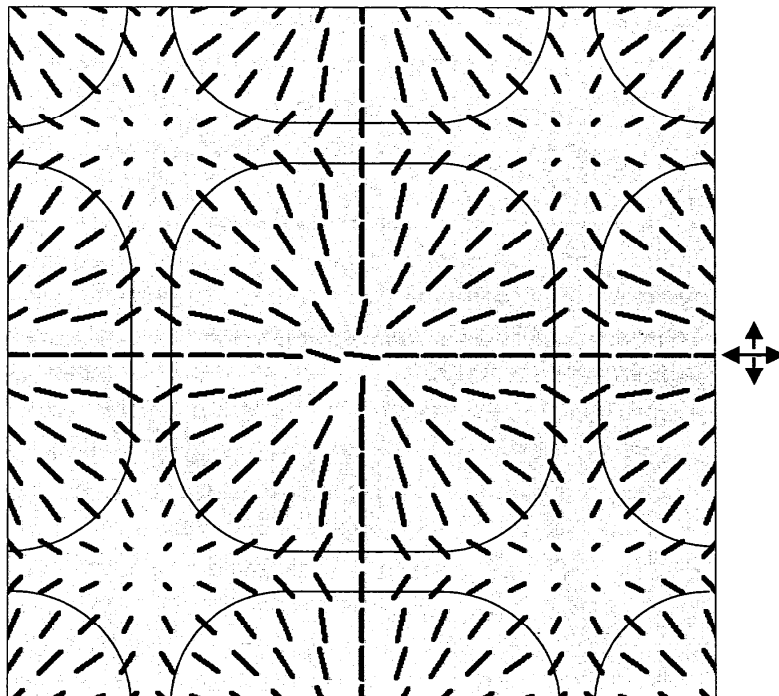


16



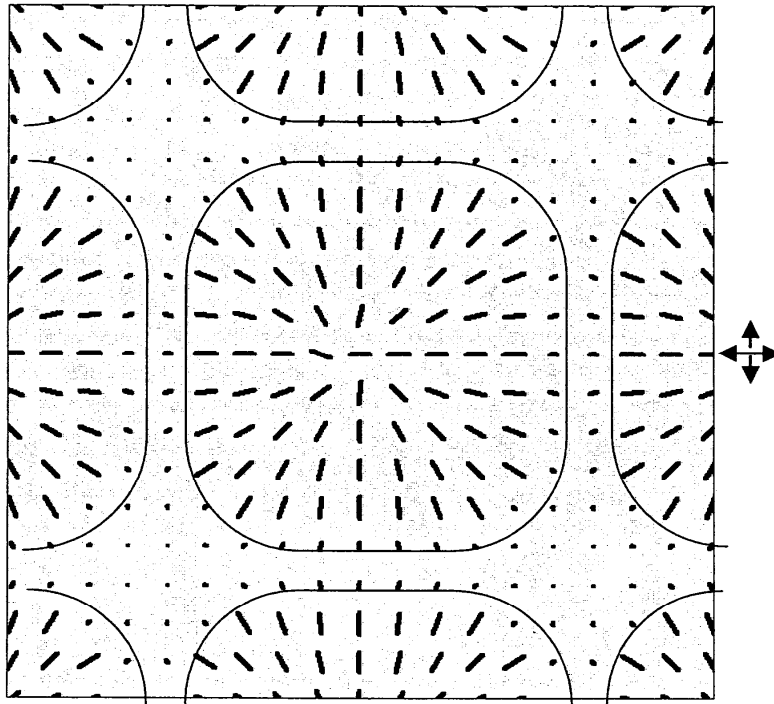
$p=0$
 $d \cdot \Delta n = 380\text{nm}$
 대향 전극 표면 부근에서

17



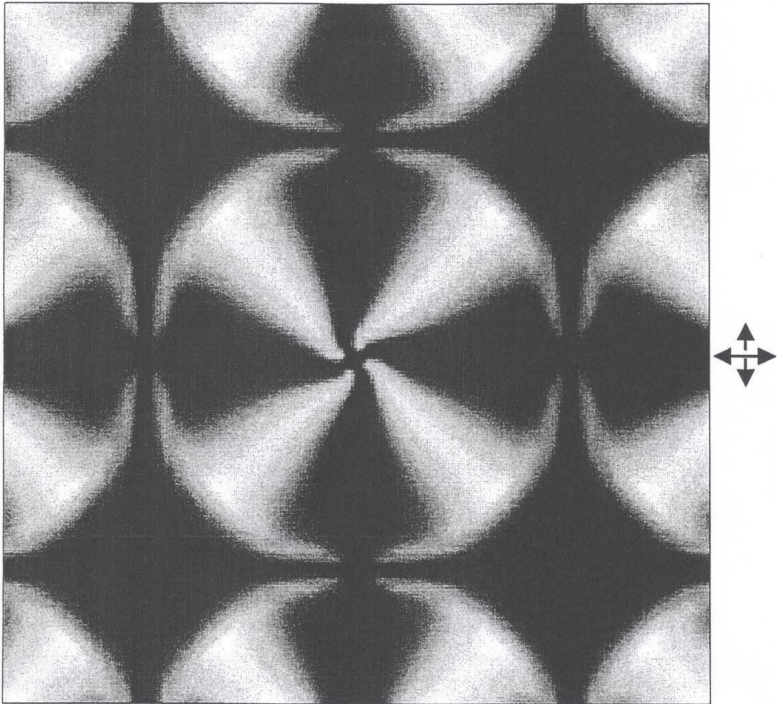
$p=0$
 $d \cdot \Delta n = 380\text{nm}$
 액정층의 중간 부근에서

18

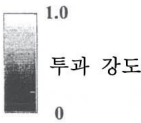


$p=0$
 $d \cdot \Delta n = 380 \text{ nm}$
 화소 전극 표면 부근에서

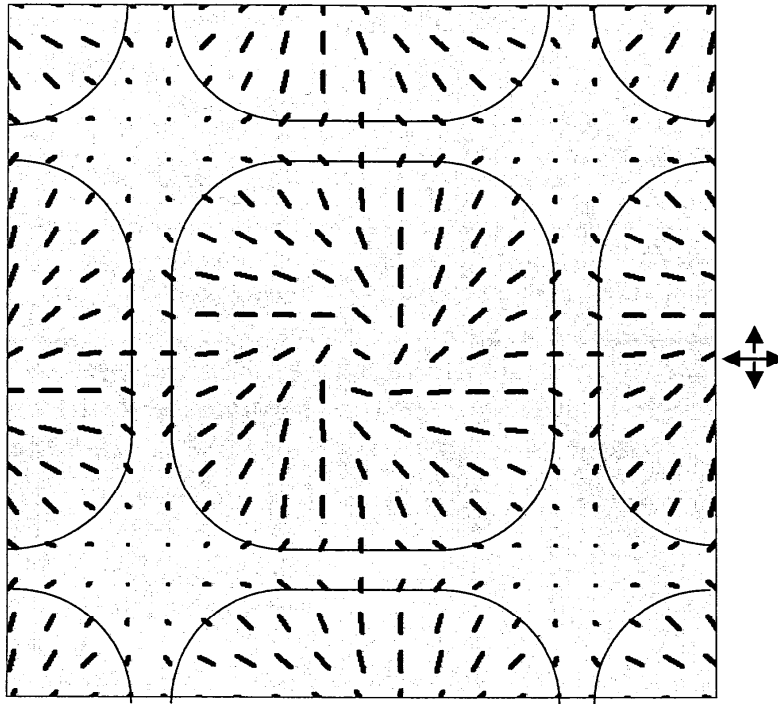
19



$p=0$
 $d \cdot \Delta n = 380\text{nm}$

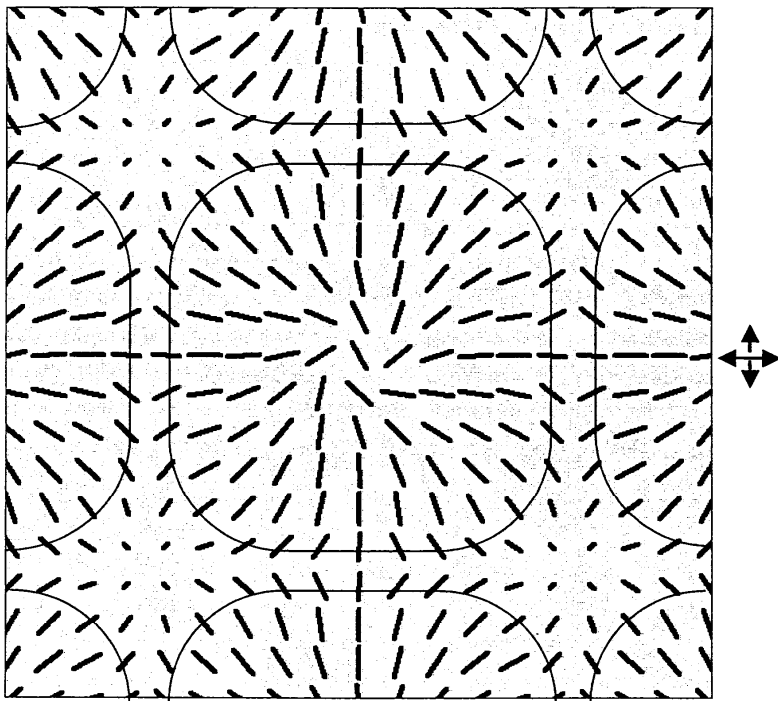


20



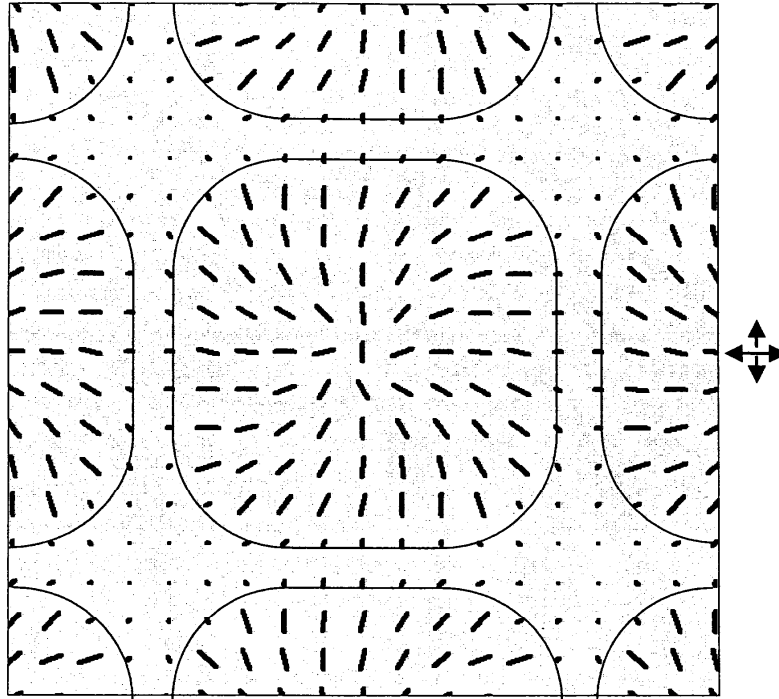
$d/p=0.13$
 $d \cdot \Delta n=500\text{nm}$
 대향 전극 표면 부근에서

21



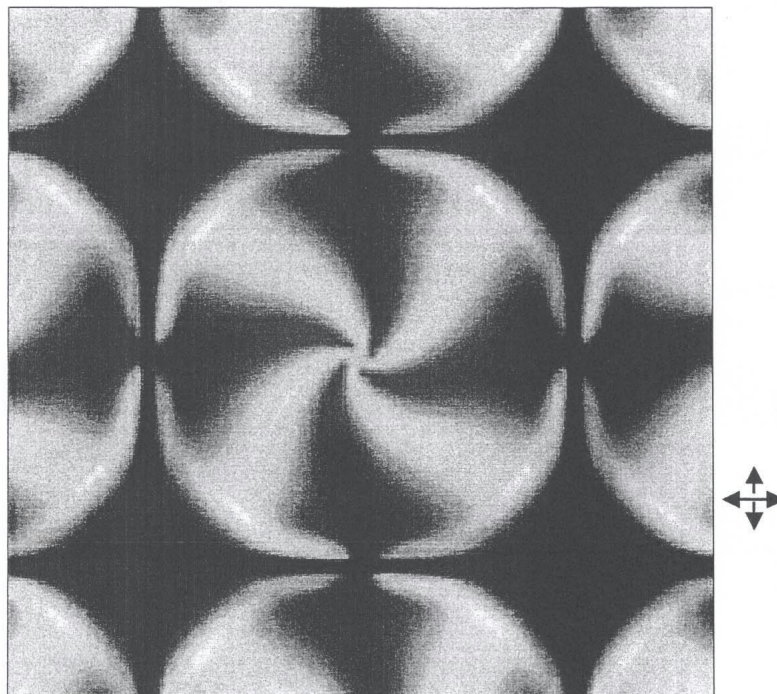
$d/p=0.13$
 $d \cdot \Delta n=500\text{nm}$
 액정층의 중간 부근에서

22

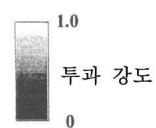


$d/p=0.13$
 $d \cdot \Delta n=500\text{nm}$
 화소전극 표면 부근에서

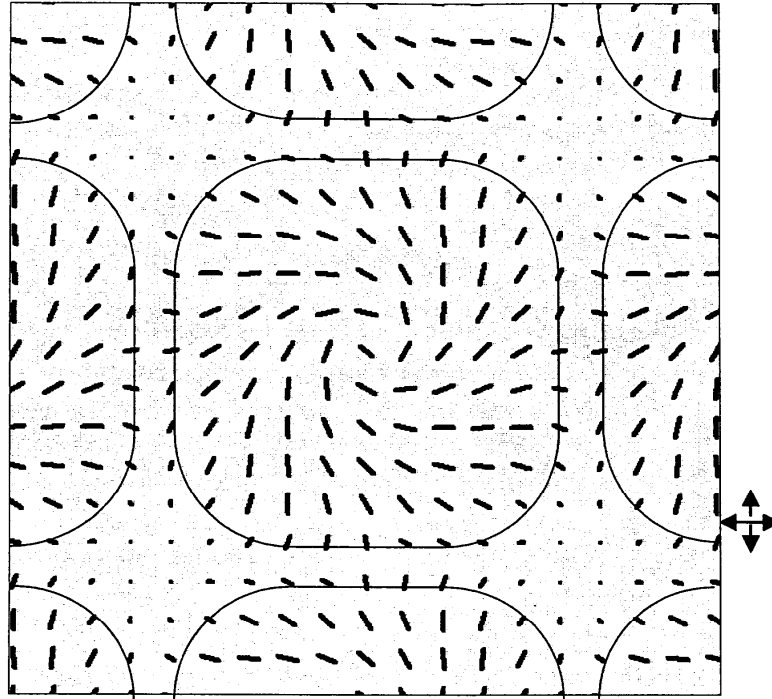
23



$d/p=0.13$
 $d \cdot \Delta n=500\text{nm}$

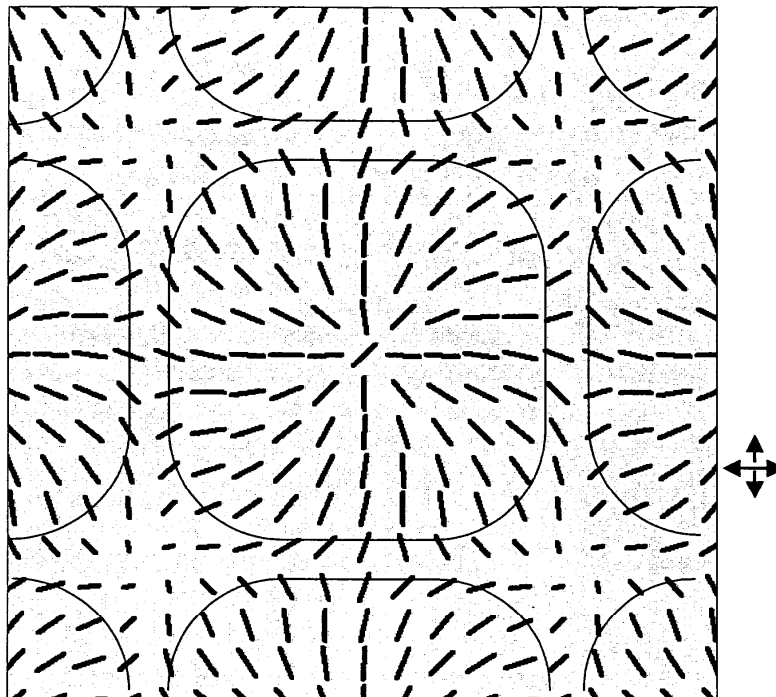


24



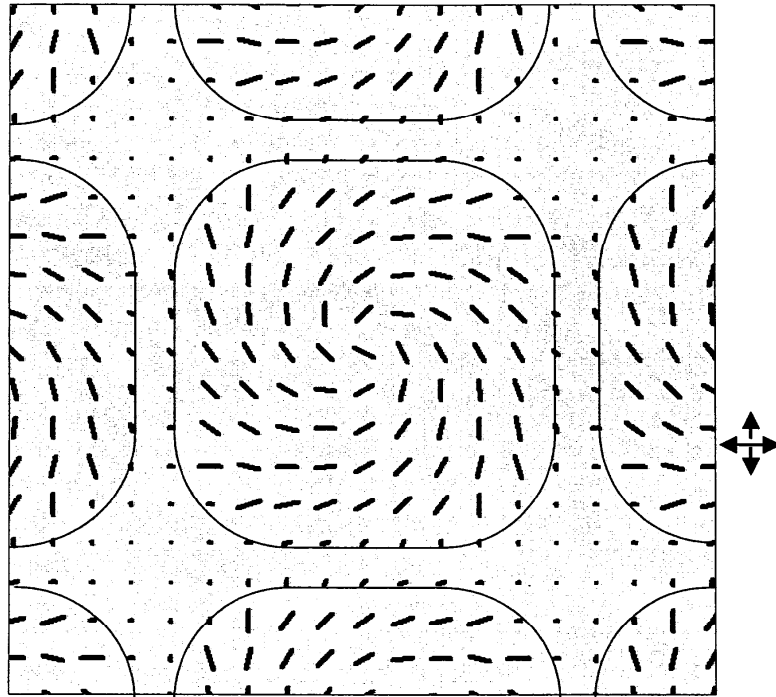
$d/p=0.38$
 $d \cdot \Delta n=600\text{nm}$
 대향 전극 표면 부근에서

25



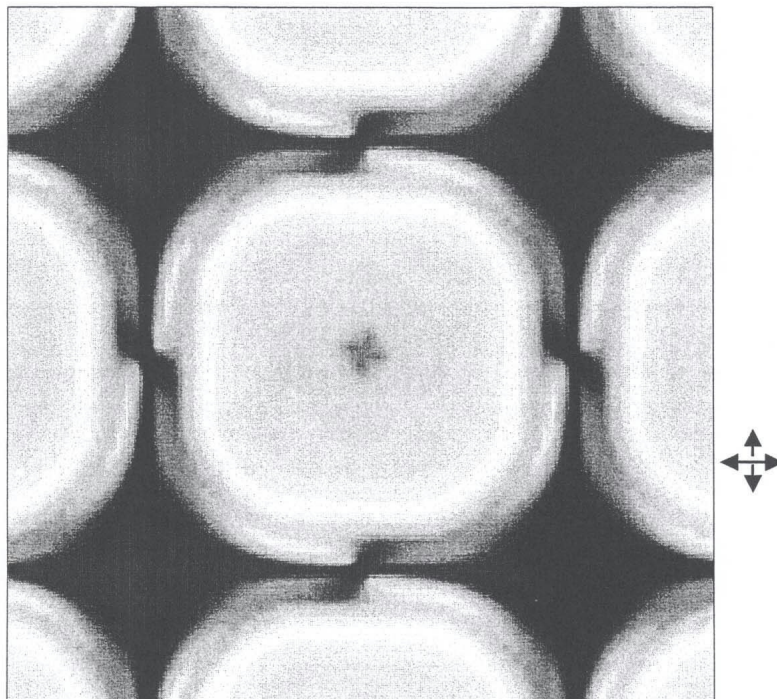
$d/p=0.38$
 $d \cdot \Delta n=600\text{nm}$
 액정층의 중간 부근에서

26

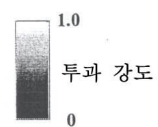


$d/p=0.38$
 $d \cdot \Delta n=600\text{nm}$
 화소 전극 표면 부근에서

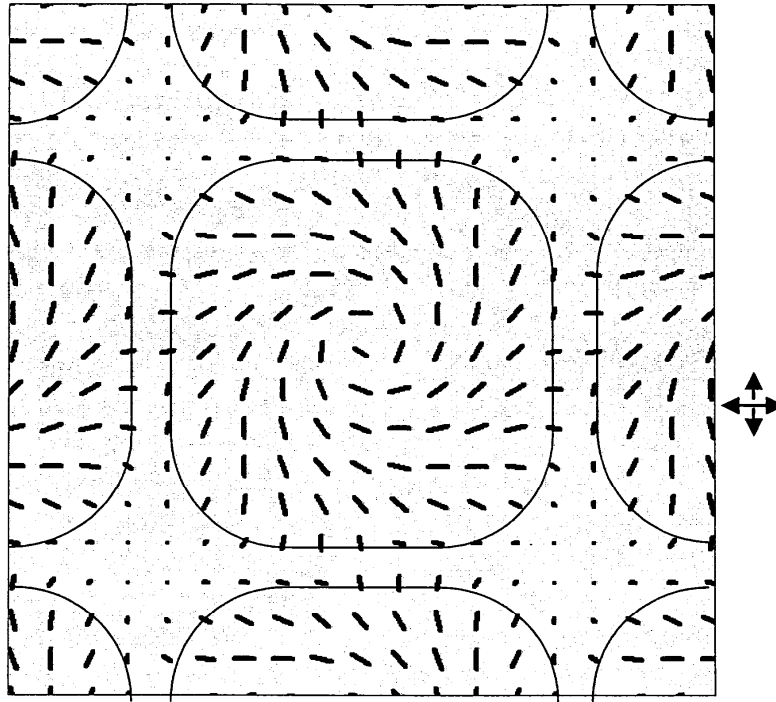
27



$d/p=0.38$
 $d \cdot \Delta n=600\text{nm}$

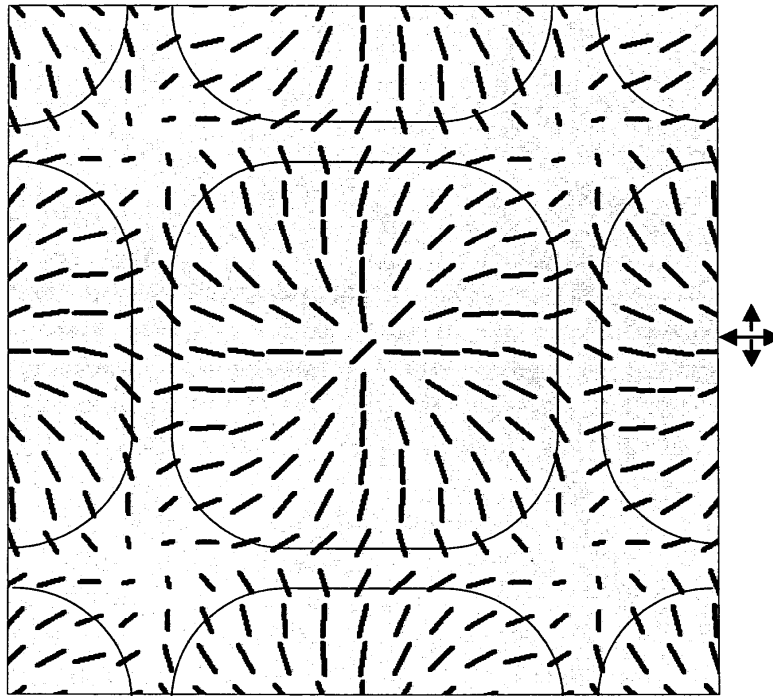


28



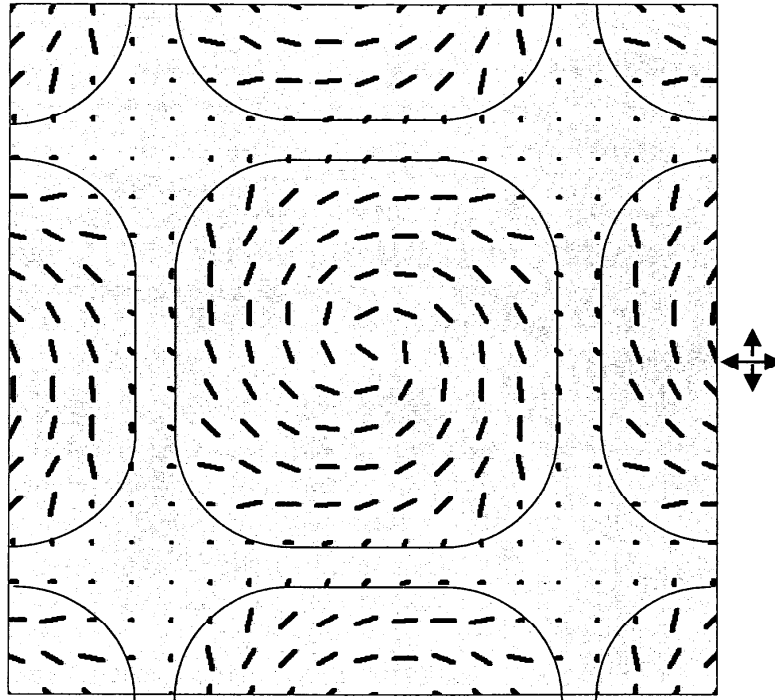
$d/p=0.48$
 $d \cdot \Delta n=680\text{nm}$
 대향 전극의 표면 부근에서

29



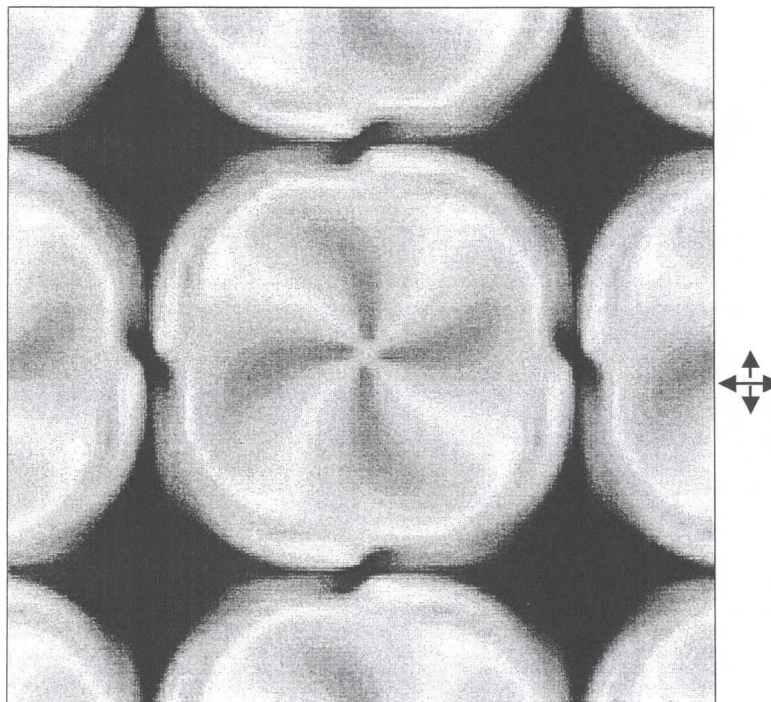
$d/p=0.48$
 $d \cdot \Delta n=680\text{nm}$
 액정층의 중간 부근에서

30

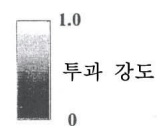


$d/p=0.48$
 $d \cdot \Delta n=680\text{nm}$
 화소 전극 표면 부근에서

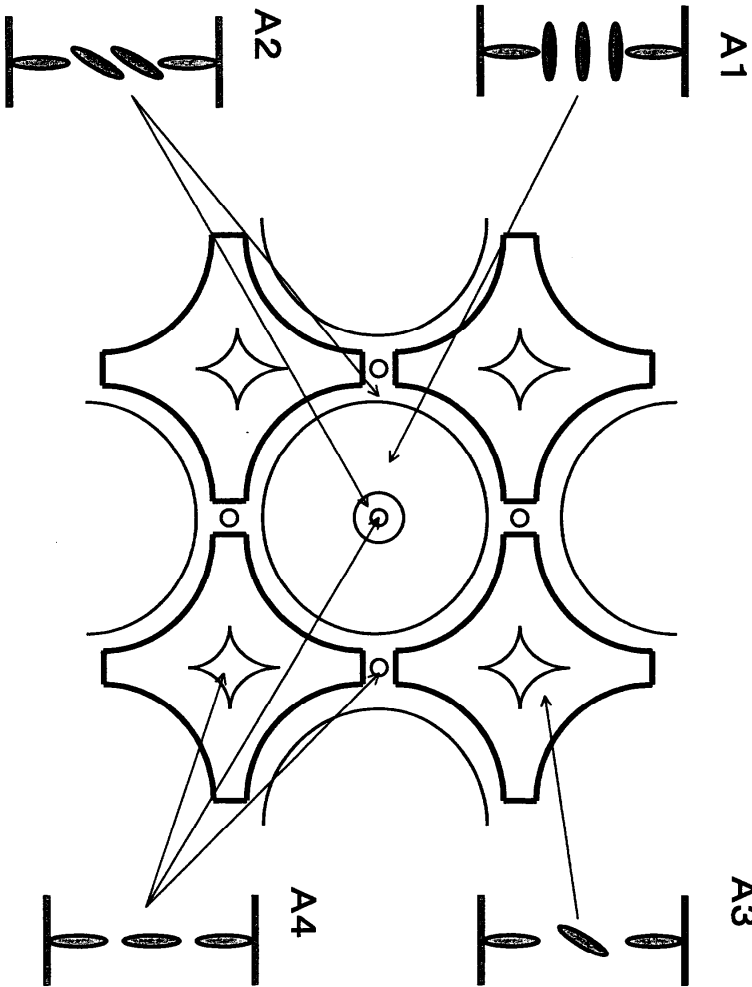
31



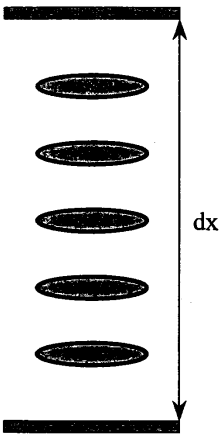
$d/p=0.48$
 $d \cdot \Delta n=680\text{nm}$



32

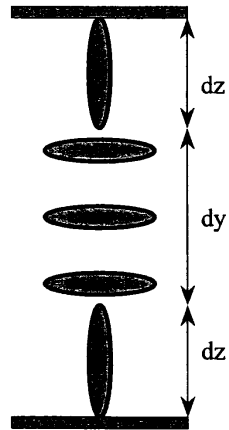


33



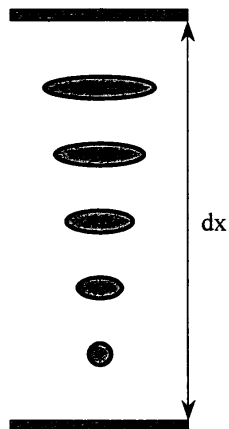
34

$$dx = dy + 2dz$$



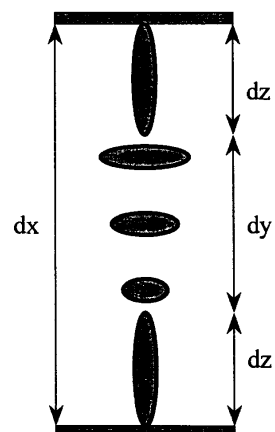
35

$$dx/p = 0.25$$

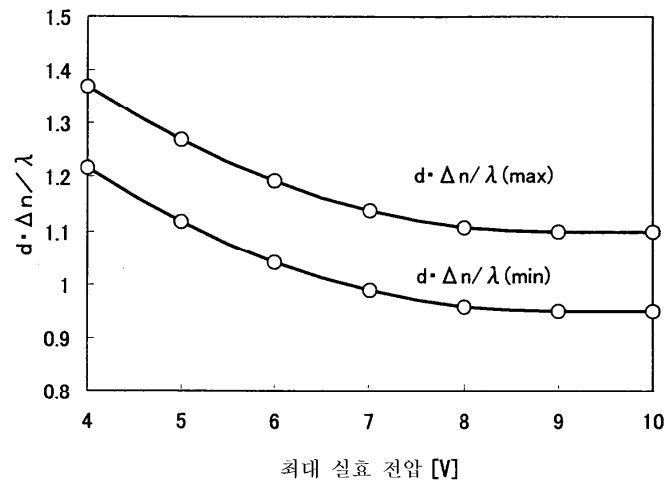


36

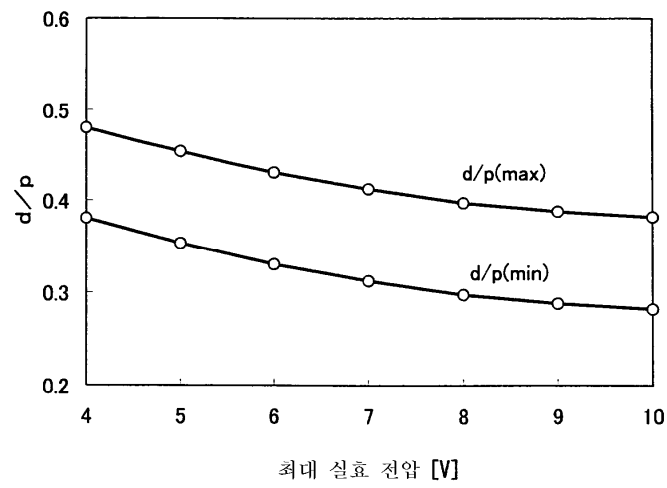
$$dx/p = 0.25$$



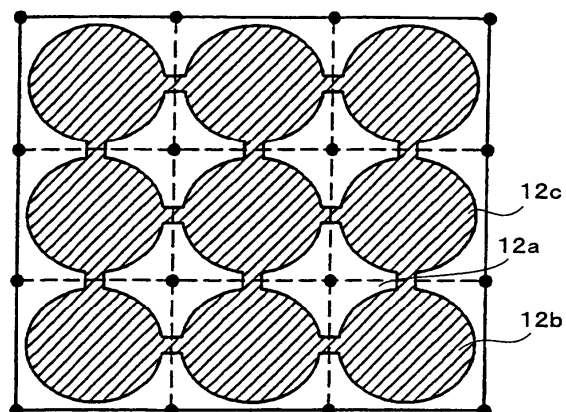
37



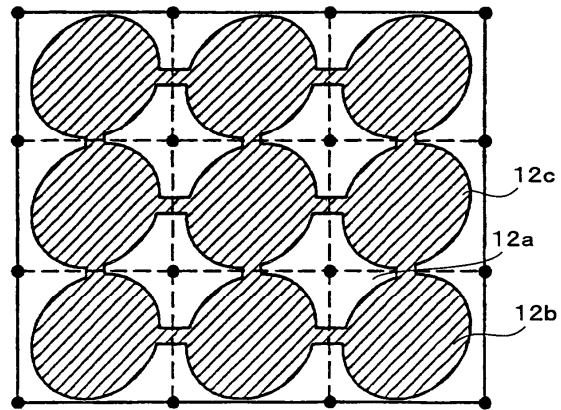
38



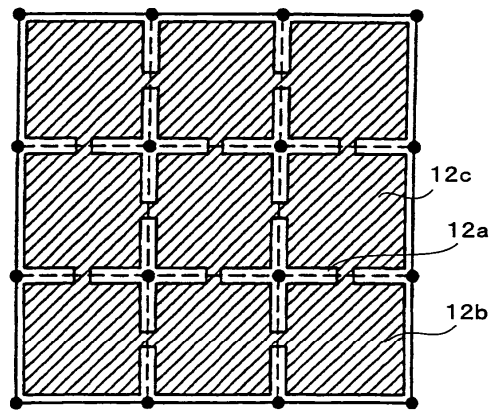
39



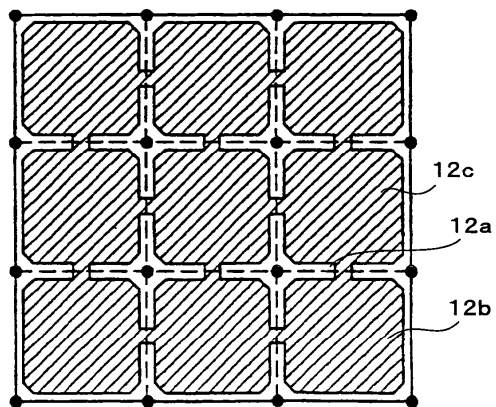
40



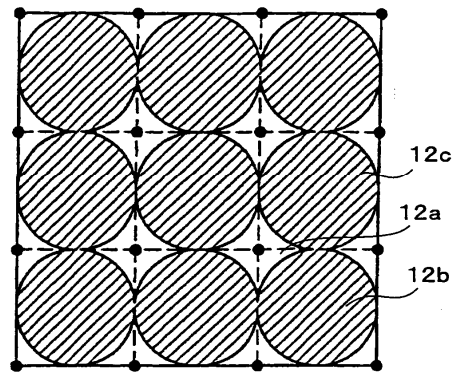
41



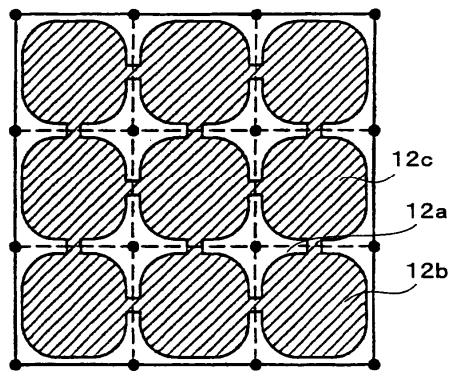
42



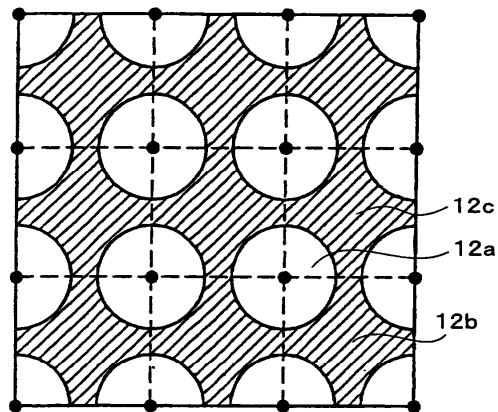
43



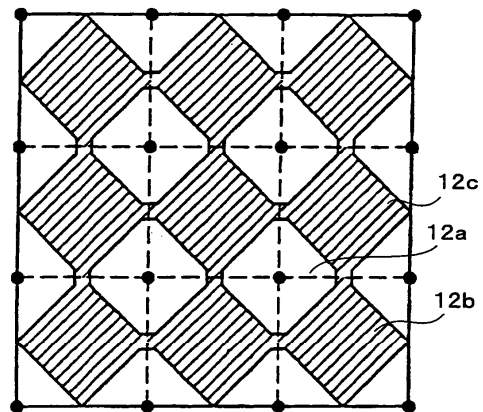
44



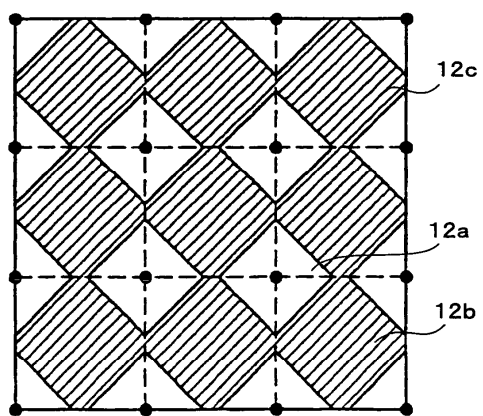
45



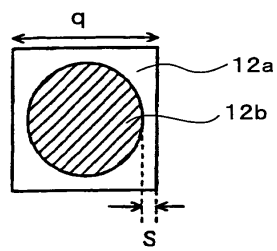
46



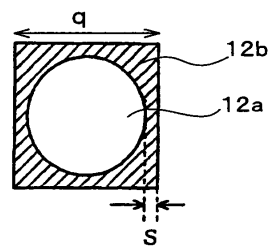
47



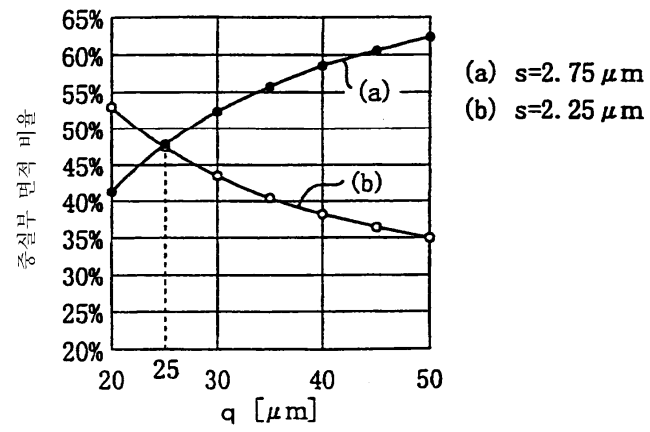
48



49



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专利名称(译)	液晶显示器		
公开(公告)号	KR1020040022166A	公开(公告)日	2004-03-11
申请号	KR1020030061641	申请日	2003-09-04
[标]申请(专利权)人(译)	夏普株式会社		
申请(专利权)人(译)	夏普株式会社		
当前申请(专利权)人(译)	夏普株式会社		
[标]发明人	OGISHIMA KIYOSHI 오기시마기요시 KUBO MASUMI 구보마스미		
发明人	오기시마기요시 구보마스미		
IPC分类号	G02F1/139 G02F1/1343 G02F1/1337 G02F1/1333		
CPC分类号	G02F1/134336 G02F1/133707 G02F1/1393		
代理人(译)	CHANG, SOO KIL		
优先权	2002262152 2002-09-06 JP		
其他公开文献	KR100523777B1		
外部链接	Espacenet		

摘要(译)

在垂直取向模式的液晶显示装置中，即使沿着交叉尼科耳取向的液晶分子在施加电压时在取向方向上存在于面内成分中，由液晶分子引起的淬火图案也是如此。从而可靠地提供用户无法识别的液晶显示装置。当在垂直取向模式下施加到液晶显示装置的液晶层的最大施加有效电压是 V_{max} [V]时，液晶层的 d/p 是 $0.0021 \times (V_{max})^2 - 0.0458 \times (V_{max}) + 0.50$ ，并且 $d \cdot \Delta n / \lambda$ 液晶层设定为 $-0.00026 \times V_{max}^3 + 0.016 \times V_{max}^2 - 0.2281 \times V_{max} + 1.7603$ 。1 指数方面 液晶层，最大有效电压，液晶分子，面积透射率

