



(FPD, Flat Panel Display)

가 , 가

가

가

가 ,

가 가

(Mass - Production)

(Printing Process)

Roll - to - Roll

/

가

2.

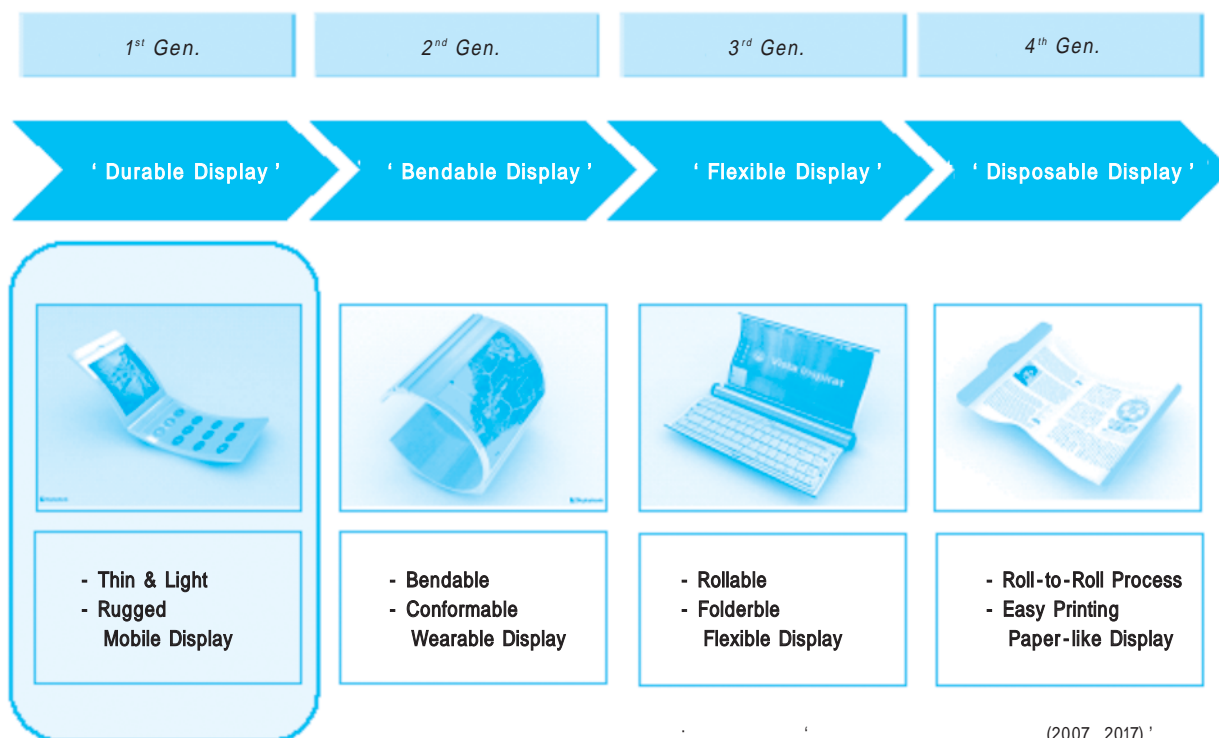
(1)

(Contrast),

가 가

CRT, LCD, PDP, OLED

(Addressing)



E - Paper

1> 4가

(2)

TV, PC

가

(3)

< 1>

TFT-LCD	
OLED	
Cholesteric	a-Si TFT
Ferroelectric	poly-Si TFT
PDLC	OTFT
Electrochromic	
Electrophoretic	
Electrodeposition	
Organic EL	

1)

가 , ,  
가

, 가 .

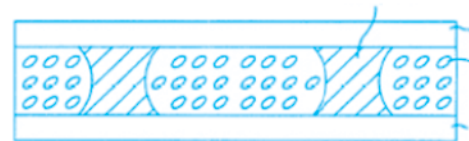
가 .

TFT - LCD  
LCD

1 ,  
<

a-si TFT

poly-Si TFT

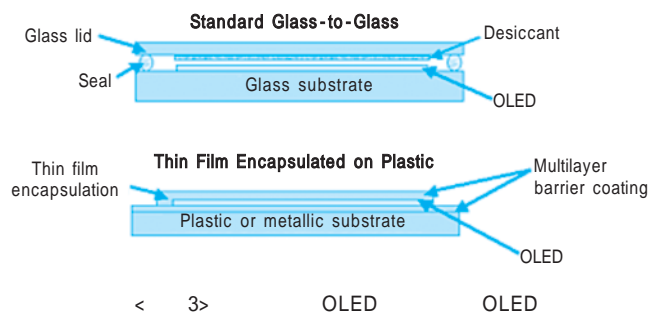


< 2> LCD

OLED(Organic Light Emitting Diodes)  
OLED EL, . LCD

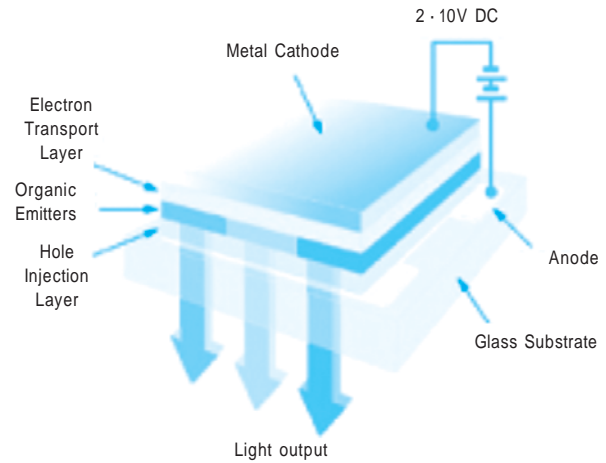
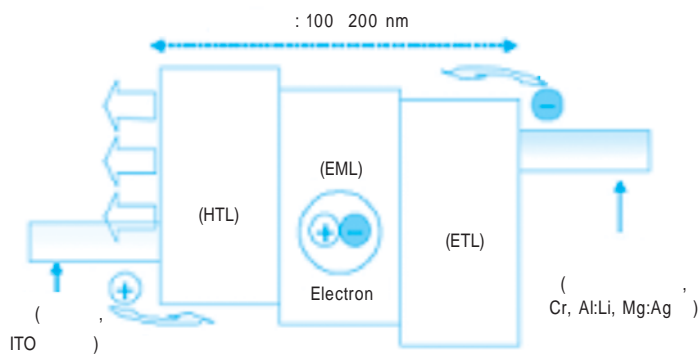
가 , ,  
가

LCD



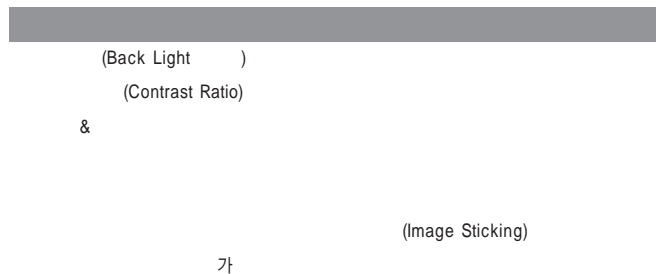
< 3> OLED OLED

[illegible]



< 4> OLED

< 2> OLED



가  
가  
가

3.

(1) OLED(Organic Light Emitting Diodes)

1) OLED

OLED

가

2) OLED

OLED

(EIL, Electron Injection Layer), (ETL, Electron Transport Layer), (HIL, Hole Injection Layer), (HTL, Hole Transport Layer), (LEL, Light Emitting Layer)

3) OLED

OLED

15 V, 10  $\mu$ s, 170°  
LCD PDP

가

가

< 3>		OLED	OLED
OLED		OLED	
<ul style="list-style-type: none"><li>•</li><li>• 가</li><li>•</li><li>• OLED</li><li>•</li></ul>		<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li></ul>	
<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li></ul>		<ul style="list-style-type: none"><li>• 가</li><li>• OLED R&amp;D</li><li>•</li><li>•</li></ul>	
<ul style="list-style-type: none"><li>•</li><li>•</li></ul>		<ul style="list-style-type: none"><li>• 가</li><li>•</li></ul>	
<ul style="list-style-type: none"><li>• : Fine Shadow Mask( )</li><li>• , UDC, Idemitsu-Kosan, Tokyo, Pioneer, Sony, Sanyo, TDK, Toshiba, Matsushita , NEC, , Mitsubishi Chemical, LG , SDI, , NESS,</li></ul>		<ul style="list-style-type: none"><li>•</li><li>• CDT, Dow Chemical, Covion, Philips, Sumitomo, Chemical, Toshiba, Seico-Epson</li></ul>	

가

가

가

가 가

OTFT

OTFT

가

Si

Ge

#### 4) OLED

OLED(SMOLED, Small Molecule OLED)  
(PLED, Polymer LED)

OLED

가

가

. OTFT

가

(2) OTFT

1) OTFT ?

(Gate)

가

( )

FET

(Source)

(Drain)

S	D	Active Layer	
Active Layer		S	D
Silicon Dioxide		Silicon Dioxide	
Doped silicon		Doped silicon	
Gate Contact		Gate Contact	

가

가

가

가

가

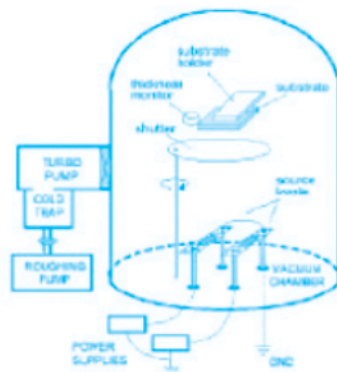
가

< 5> Staggered(Top Contact) ( ) Bottom Contact ( )

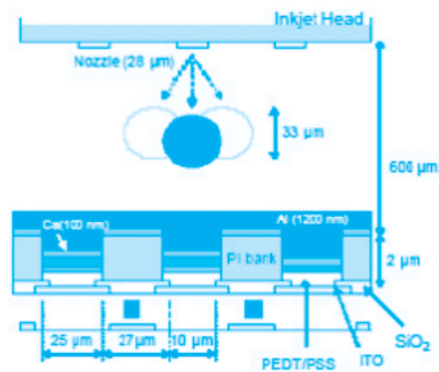
OTFT

1980

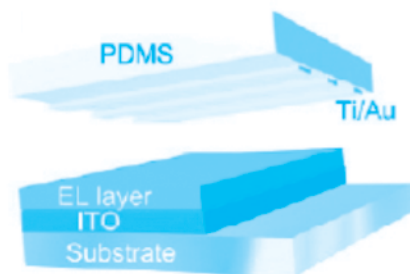
(On/Off Ratio)



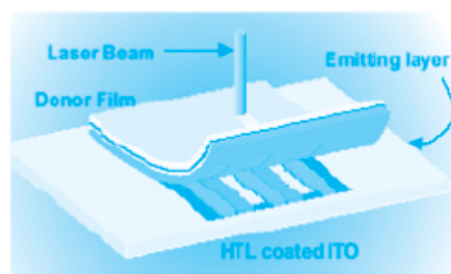
(a)



(b)



(c)



(d)

(a)

(b)

(c)

(d) LTT

< 6> OTFT

2) OTFT : , μm 가 -  
(Microcontact Printing)

OTFT 가 (Transfer)  
25 μm , (Nanoscale Interaction)

(Hydrophobic) de-wetting . 가 SAM(Self-Assembled Monolayer) 가 .  
PEDOT/PSS 1/2 200 PDMS(Poly-dimethoxysilane) (Modulus) .  
nm . 가 .

PCB .  
(Laser Thermal Transfer Printing)  
( Thermal Imaging)  
가 75 μm . 100 LCD (Color Filter)

(Nanoparticle Composite)

(Ablative Transfer)

• OTFT

가

가

가

가 가

가 가

가

(Polaron)

가

1.

e-paper

2

e-paper

17.8 cm

TFT-LCD

, 가

, 가

‘ e-book ’

2008

.Amazon

e-book ‘

Polymer

가

Vision

Plastic Logic

e-book

LG Display

가

2011

7.6 cm

LCD

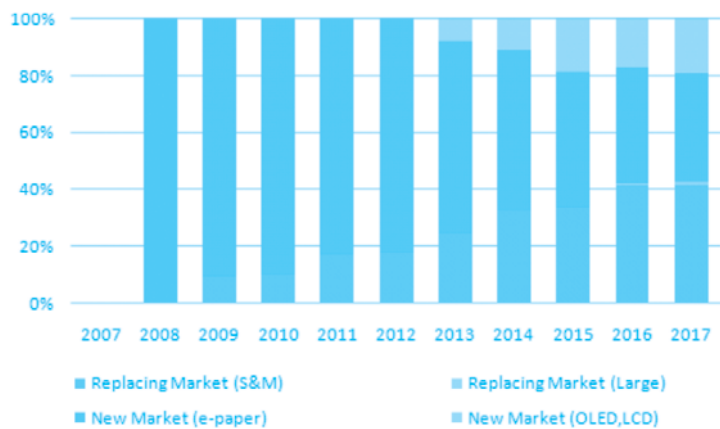
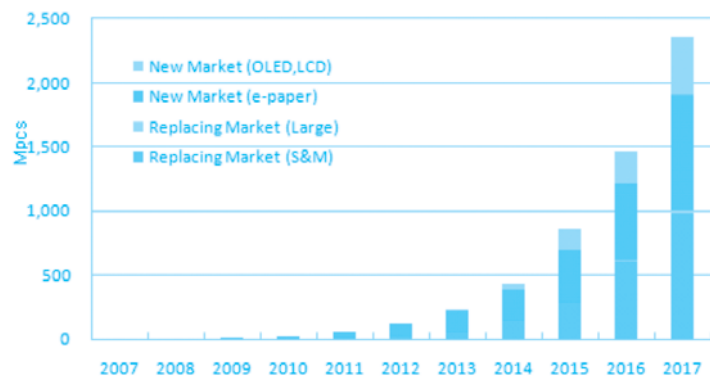
OLED

, 2013

10.2 cm

22.9 cm

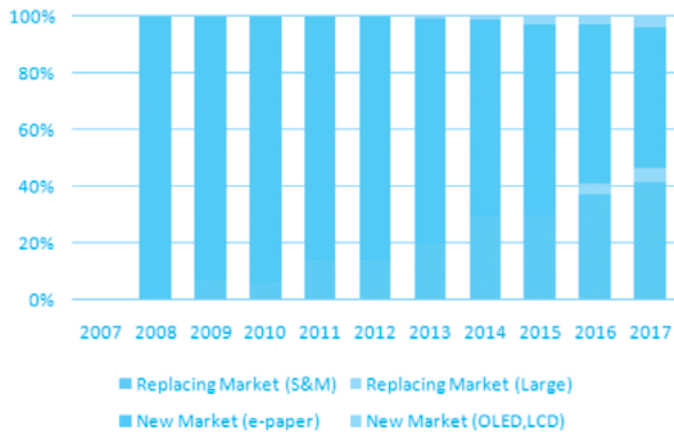
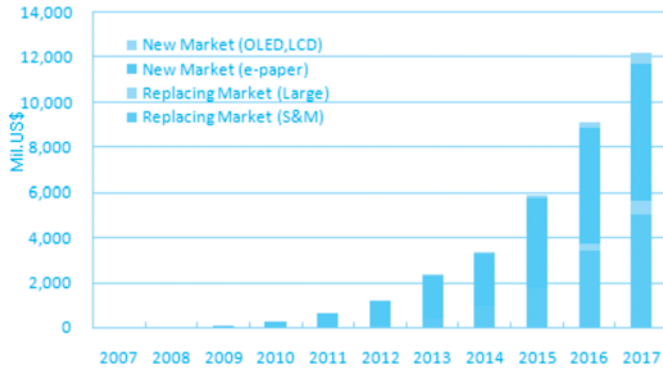
OLED



(2007 ~ 2017) ‘

< 7>





(2007 ~ 2017)

< 8 >

TFT-LCD

가

. 2016

LCD, OLED

25.4 cm

, TV,

## 1. Sony

LCD	LG Display, Samsung, ITRI, Sony
OLED	LG, Pioneer, Samsung SDI, Universal Display, Dupont, Fujitsu, Sony
E-Paper	E-Ink, Bridgestone, Gyricon media, Kent Display, Sipix, Iridigm, Sony, Minolta, Toshiba, Hitachi, Seiko-Epson

Sony 2007 5 6.4 cm Full color OLED

OTFT

0.3 mm

120 x 169 Pixel

가 , 1.5 g



: <http://www.sony.com>

< 1> Sony 6.4 cm , Full Color OLED



< 2> IMID2007

2. ITRI 17.8 cm LCD 가 .

ITRI가 26.4 cm 3.

LCD(Ch - LCD) LED (BLU) . 26.4

cm 36.3 cm TFT -

, 10 mm , LED BLU LCD E - Paper(Electrophoretio/a - Si TFT on Plastic)



< 3> IMID2007 LG Display a-Si AMOLED( ) ( )



< 4> 2007 ETRI

LG Display (a-Si)  
 , Full Color AMOLED  
 AMOLED 10.2 cm QVGA (320×240)  
 , 0.15 mm  
 LG

ETRI 1999  
 2002 OLED e-paper

‘ 2007  
 (ETRI)  
 (E-Paper)

< >

- 1) (http://diana.korea.ac.kr)
- 2) PRICER , <http://www.pricer.com>
- 3) SiPix , <http://www.sipix.com>
- 4) E-Ink , <http://www.eink.com>
- 5) Sony , <http://www.sony.com>
- 6) Gyricon Display , <http://www.gyricon.com>
- 7) LG Display , <http://www.lgdisplay.com>
- 8) AMLCD ,
- 9) Engadget , <http://www.engadget.com>
- 10) Newlaunches , <http://www.newlaunches.com>
- 11) , <http://www.displaybank.com>
- 12) , <http://techon.nikkeibp.co.jp>