

 **DES**

# Display Technology

Dalian Good Display Co., Limited



- 1 E-paper Display Application**
- 2 New Technology - DES**
- 3 Performance Difference Between Original Technology and The DES**
- 4 Cost Difference Between Original Technology and The DES**
- 5 Full Range of The DES Displays**
- 6 Sample Comparison Between Original Technology and The DES**
- 7 Wide Application Areas for DES in The Future**

# Contents



# C O N T E N T S

## **PART 01** | E-paper Display Application



# E-paper Display Application



## E-book

E-book is a handheld reader that digitizes the content of text, pictures, sounds, images, and the like, and a set of storage and display terminals that embed or download digital text, pictures, sounds, images, and the like.



## E-notebook

E-notebook is a kind of intelligent high-tech product that can replace traditional notebook and original handwriting. It is the latest fashion technology product and green product. It is mainly used for political and business people to use for mobile office and entertainment.



## E-paper Display Application



### Electronic Price Tag

An electronic display device that can replace the traditional paper price tag, is connected to the store database through the network, and displays the latest product information.



### Electronic Price Tag

It is an electronic display device with information transmission and reception function, and is mainly used in electronic labels for displaying price information in supermarkets, convenience stores, pharmacies, and the like.



### Electronic Price Tag

The shelf was incorporated into the computer program, freed from the manual replacement of price tags, and the price consistency between the checkout counter and the shelf was achieved.



# Application Scenario



Smart Home



Smart Card



E-nameplate



Smart Phone

Intelligent Terminal



Smart Bus



Gas Station



Wisdom House Number



Electronic Tag



E-notebook



Public Information



Smart Medical



# Application Scenario



E-paper Whiteboard



Building Decoration



Cafe Menu



Traffic Sign



Logistics Label



Luggage Tag



Gas Station Price Tag



Cinema Board



Phone Case



Exhibition Board



Billboard



Laptop Keyboard



Shelf Label



ESL Tag



Trunk

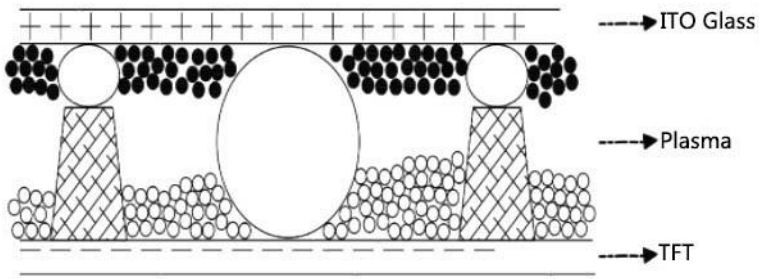
# C O N T E N T S

## **PART 02** | **New Technology - DES** Display Electronic Slurry ( DES )

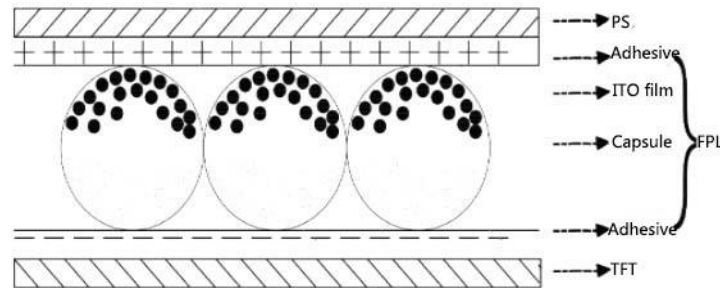




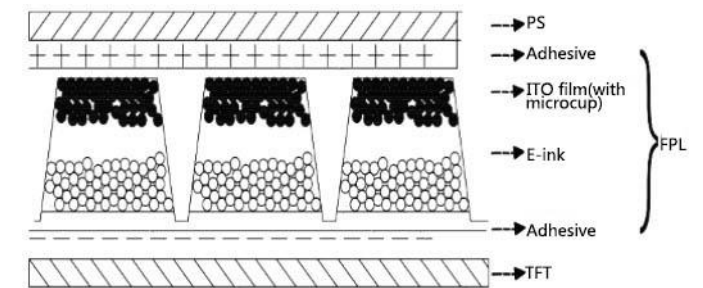
## Structure Diagram of New and Original Technology



**Cofferdam**



**Micro-capsules**



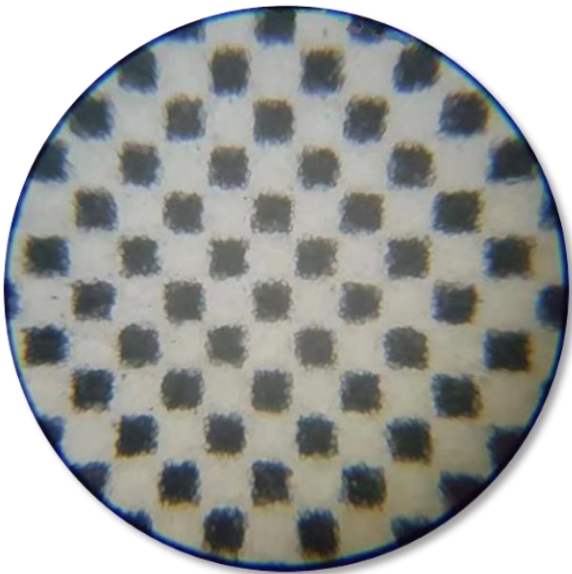
**Micro-cup**

## Display Electronic Slurry ( DES )

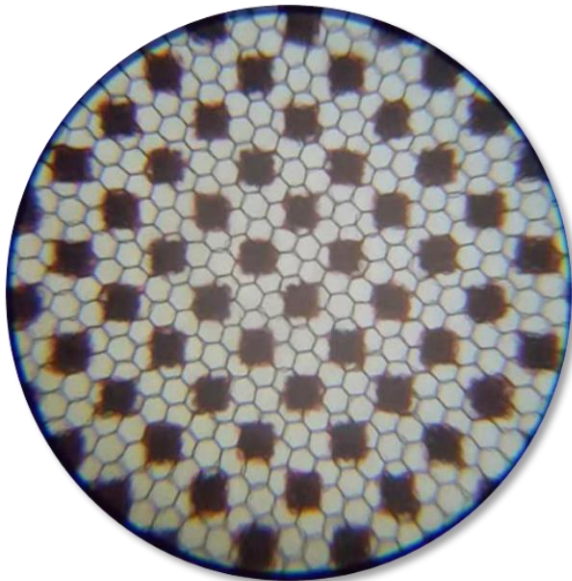
The DES display module adopts a new display structure which is completely different from the current micro-cup and micro-capsule structure. The structure forms a layer of cofferdam structure on the surface of the TFT by forming a cofferdam around the periphery of a single pixel electrode, and the bank covers the source and gate lines on the TFT. The patterned structure is characterized in that each pixel electrode is surrounded by a cofferdam, the microstructure is not visible on the front side, and the number of layers is reduced, thereby obtaining the higher definition and resolution display effect. In order to distinguish it from the traditional micro-cup and micro-capsule technology, we call it the new display electronic slurry (DES) technology.



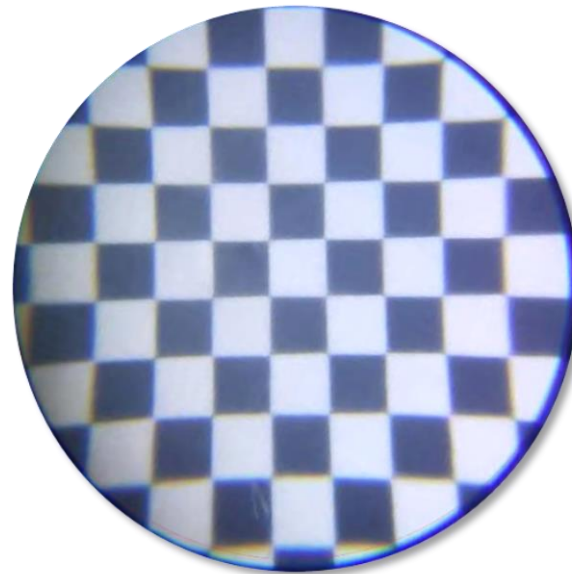
## Pixel Display Difference



**Micro-capsule Pixel Display**



**Micro-cup pixel display**

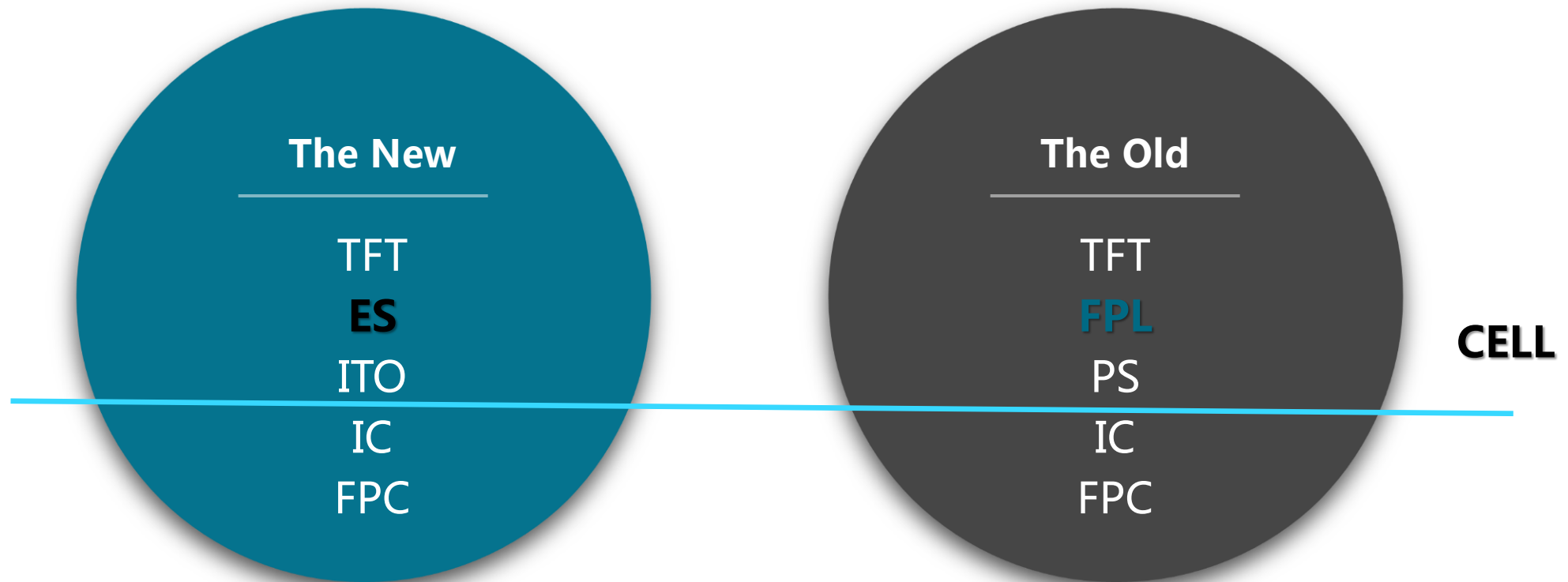


**DES pixel display**





## Process Difference Between Original Technology and The DES

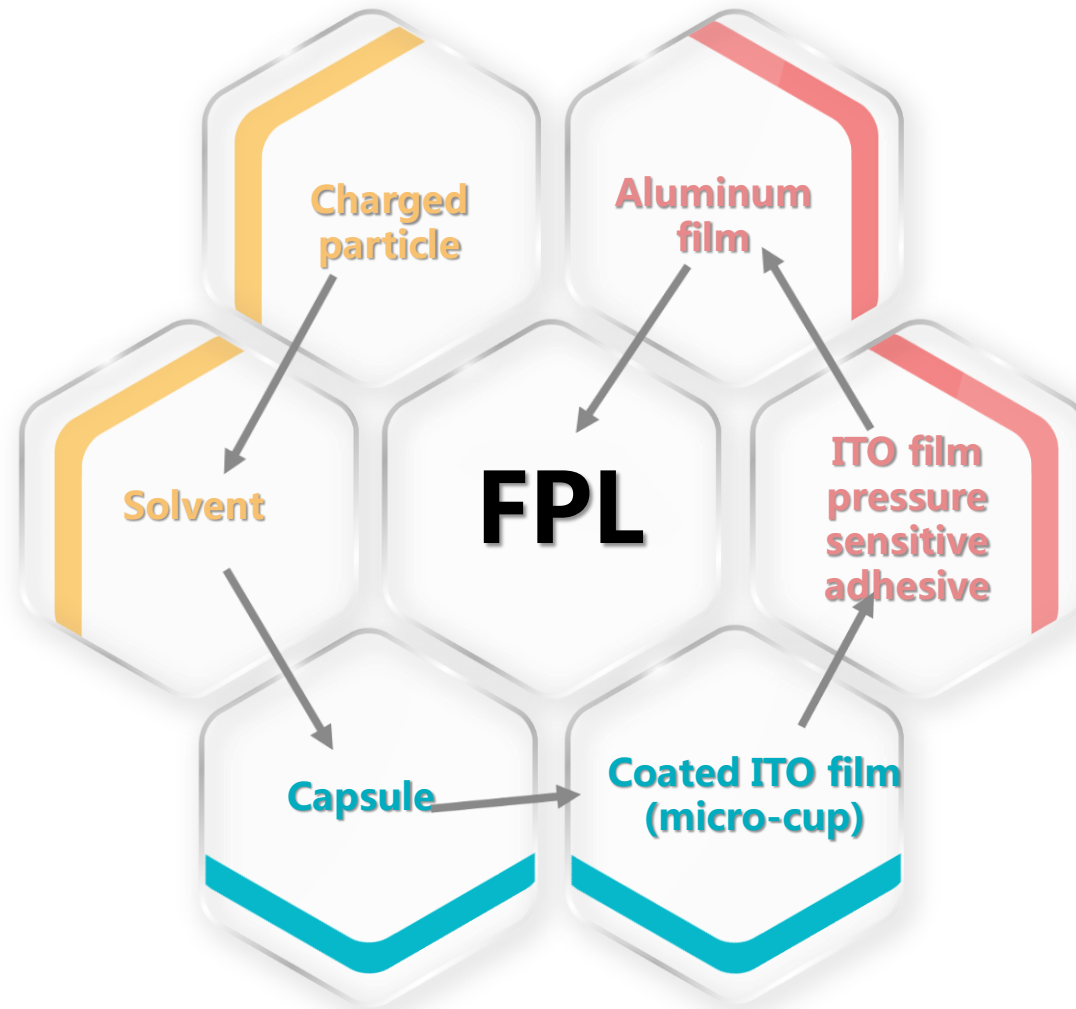


### EPD Module

ES: Electronic Slurry  
FPL: Front Plane Laminate



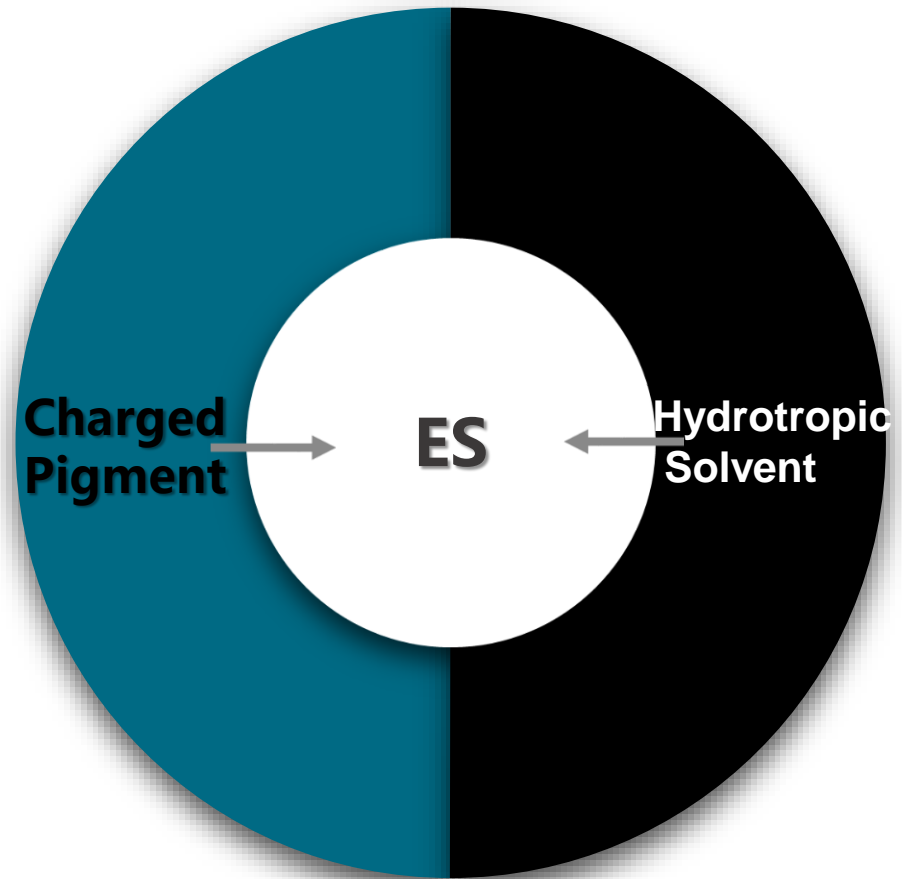
## E-ink Front Plane Laminate (FPL) Process







## Composition of ES (Electronic Slurry)



# C O N T E N T S

## **PART 03** | Performance Difference Between Original Technology and The DES





## Performance Difference Between EPD and DES



### Operating Temperature.

DES : -20°C~60°C  
EPD : 0°C~50°C



### Working Humidity

DES : 0°C~80°C  
EPD : 25°C~60°C



### Contrast

DES : >1 : 45  
EPD-BW : <1 : 8  
EPD-Tri-color : <1 : 25



### Resolution

DES : Max 600DPI  
EPD : Max 300DPI



### Power consumption

DES : 1~3mA  
EPD : 2~5mA

# Pros and Cons of DES and EPD



No.	Performance	EPD	DES	Remarks
1	Reflectivity	Reflectivity Black Reflectivity White (Full Color) Reflectivity Black (Full Color) Reflectivity White	Reflectivity Black : 0.64 Reflectivity White : 60.3 (Full Color) Reflectivity Black : 0.59 (Full Color) Reflectivity White : 25.96	(Bare display) Reflectivity White DES 7.8 inch : 27.57 (Module) Reflectivity White DES 7.8 inch : 23.61 (Bare display) Reflectivity White DES 10.1 inch : 25.5 (Module) Reflectivity White DES 10.1 inch : 21.5 (Module is with a full set of Huawei materials)
2	Bistability		(Full Color)L value with image start in Black : 5.5 (Full Color)L value 2min after, image in Black : 5.4 (Full Color)L value with image start in White : 59.5 (Full Color)L value 2min after, image in White : 59.3 ( Ignoring the instrument measurement deviation, the L value is stable )	The slight deviation of each measurement of the instrument is negligible (Konica CM700D)
3	Contrast	B/W : $\geq 1 : 25$ Full Color : $\geq 1 : 15$	B/W : $\geq 1 : 60$ Full Color : $\geq 1 : 25$	
4	Color Gamut	2-3%NTSC	$\geq 10\%$ NTSC	(Bare display)DES 7.8 inch full color : 14.6%NTSC (Module)DES 7.8 inch full color : 12.5%NTSC (Bare display)DES 10.1 inch full color : 15%NTSC (Module)DES 10.1 inch full color : 11.3%NTSC
5	Resolution(B/W)	Up to 300PPI	Up to 600PPI	TFT production resolution up to 600PPI with IGZO/LTPS process
6	Resolution (Full Color)	Resolution(B/W)/3; RGBW , Resolution(B/W)/2 (lower color gamut)	Resolution(B/W)/2	There is a patent on the arrangement algorithm of RGB



# Pros and Cons of DES E-Paper and E Ink E-paper



No.	Performance	EPD	DES	Remarks
7	Operating Temperature	0-50°C	-20-60°C	
8	Operating Humidity	50°C 25-60%	60°C 0-80%	Adapt to the application of high temperature environment in desert climate and high humidity environment in Southeast Asia
9	Driving Voltage	G : ±20 S : ±15	G : ±20-±16 S : ±15-±11	
10	Power Consumption	DES driven by lower voltage, the power consumption is reduced by more than 20%		
11	Hardness	≥3H@5N	Exclude glass cover	
12	Border	Border 0.3-0.5mm+frame glue 2.5mm	Border 0.5mm+frame glue 1.5mm	DES can be used for narrower bezel product development
13	OCA glue thickness	175μm	50μm	(Protective film of EPD removed,) There is a frame glue step to be filled with 175μm OCA
14	V-com voltage	Each piece must be detected, adjusted, and input with a voltage value	Fixed value	
15	Dimension	Due to the limitation of FPL width and yield rate, large size will be expensive, and super large size is hard to come by	In principle, how large is the size of the TFT substrate can be made, likewise large can be made of the DES module.	
16	Price	There is a huge difference in the cost of the core material of the EPD, the E Ink film and of the core material of DES, electronic slurry. The direct material cost of DES is reduced by more than 30%, and the large size is more advantageous.		
17	Press test	10KGF	10-12KGF	Tested in form of modules
18	Flexibility	flexible	not flexible (for the time being)	DES flexible products is the future trend
19	Lifespan			

# C O N T E N T S

## **PART 04** | Cost Difference Between Original Technology and The DES





Cost Difference



EPD  
DES

**Cost Reduction↓**

# C O N T E N T S

## **PART 05** | Full Range of The DES Displays





## BW Series



2.13 inch



2.15 inch



1.54 inch



2.9 inch



5.83 inch



## BWR Series



2.13 inch



2.15 inch



1.54 inch



2.9 inch



5.83 inch





## BWY Series



▼  
**2.13 inch**



▼  
**2.15 inch**



▼  
**1.54 inch**



▼  
**2.9 inch**



▼  
**5.83 inch**



## BWO Series



2.13 inch



2.15 inch



1.54 inch



2.9 inch



5.83 inch





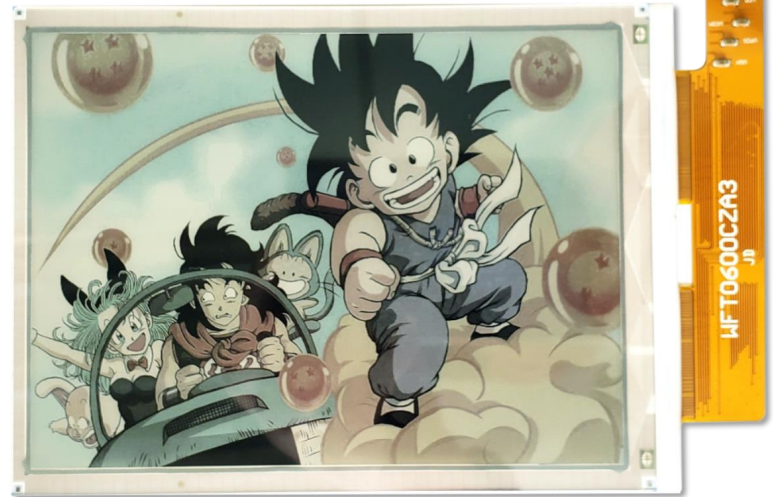
## Full Color Series



▼  
**6.7 inch**



▼  
**4.2 inch**



▼  
**6 inch**



▼  
**7.8 inch**



# C O N T E N T S

## **PART 06** | Sample Comparison Between Original Technology and The DES



## Sample Comparison Between EPD and DES



EPD

DES



DES

EPD

# C O N T E N T S

## **PART 07** | More Application for DES in The Future





## Other Exploitable Application



Pressure Gauge



Electric Meter



Instrumentation



Production Line Signate



Temperature and Humidity Board



Station Waiting Sign



Bank Counters



Queuing Machine





## Other Exploitable Application



## Smart Classroom





# DES

# Display Technology

Thanks For Watching