



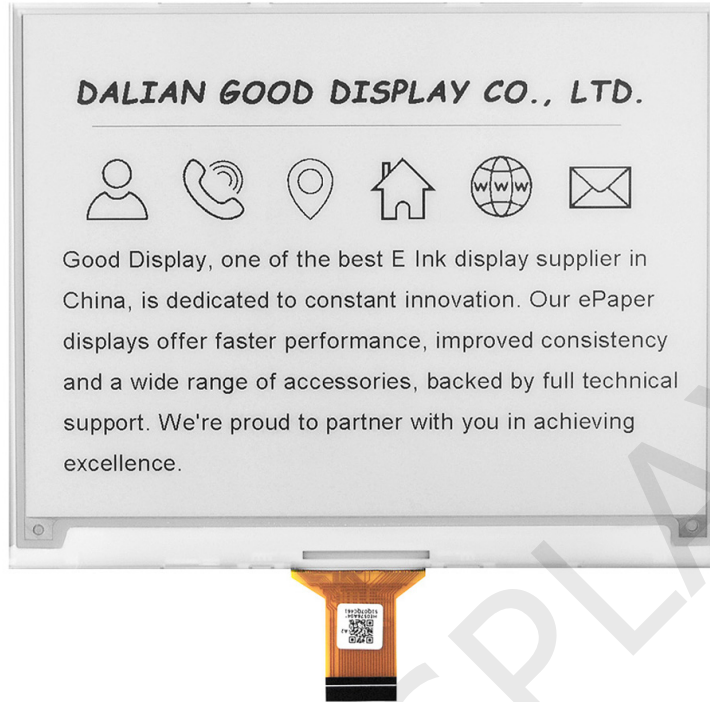
## 5.76 inch E-paper Display Series



**GDEH0576T81**

Dalian Good Display Co., Ltd.

# Product Specifications



<b>Customer</b>	<b>Standard</b>
<b>Description</b>	<b>5.76" E-PAPER DISPLAY</b>
<b>Model Name</b>	<b>GDEH0576T81</b>
<b>Date</b>	<b>2025/04/11</b>
<b>Revision</b>	<b>1.0</b>

	Design Engineering		
	Approval	Check	Design
			

No.17 Gonghua Street, Shahekou District, Dalian 116021 China

Tel: +86-411-84619565

Email: info@good-display.com

Website: www.good-display.com

---

## Table of Contents

1. General Description .....	3
2. Environmental.....	9
3. Electrical Characteristics.....	12
4. Optical characteristics .....	13
5. Point and line standard .....	15
6. Packing.....	16
7. Precautions.....	17

GOODDISPLAY

## 1. General Description

### 1.1 Over View

GDEH0576T81 is an Active Matrix Electrochromic Display (AMEPD), with interface and a reference system design. The 5.76" active area contains 920\*680 pixels, and has B/W full display capabilities. An integrated circuit contains gate buffer, source buffer, interface, timing control logic, oscillator, DC-DC,SRAM, LUT, VCOM and border are supplied with each panel.

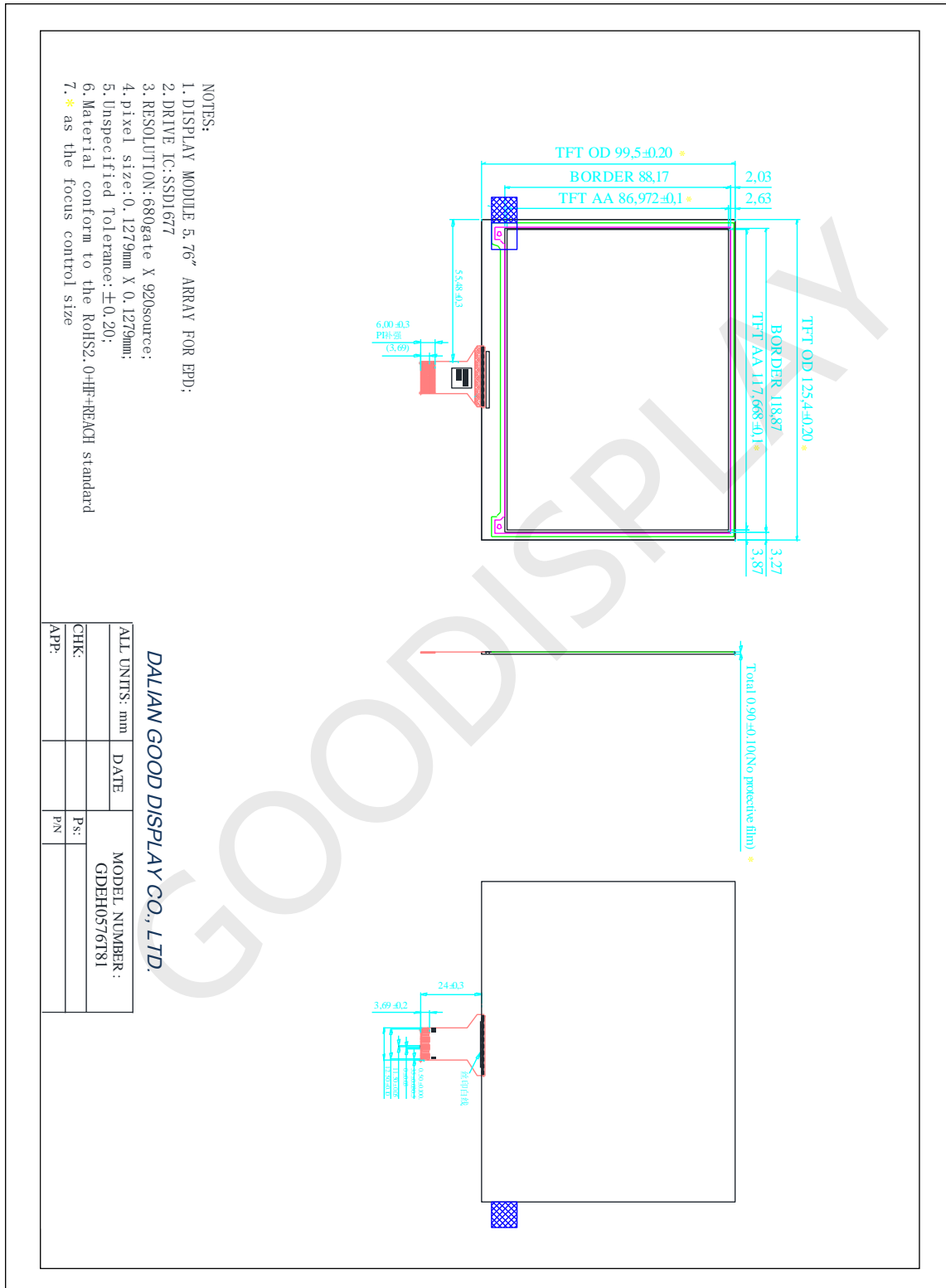
### 1.2 Features

- 920\*680 pixels display
- High contrast & High reflectance
- Ultra wide viewing angle
- Ultra low power consumption
- Pure reflective mode
- Bi-stable display
- Commercial temperature range
- Landscape, portrait modes
- Hard-coat antiglare display surface
- Ultra Low current deep sleep mode
- On chip display RAM
- Low voltage detect for supply voltage
- High voltage ready detect for driving voltage
- Internal temperature sensor
- Waveform stored in On-chip OTP
- 10-byte OTP space for module identification
- Serial peripheral interface available
- On-chip oscillator
- On-chip booster and regulator control for generating VCOM, Gate and Source driving voltage
- I2C signal master interface to read external temperature sensor/ built-in temperature sensor

### 1.3 Mechanical Specifications

Parameter	Specifications	Unit	Remark
Screen Size	5.76	Inch	
Display Resolution	920(H)×680(V)	Pixel	Dpi: 198
Active Area	117.668(H)×86.972 (V)	mm	
Pixel Pitch	0.1279×0.1279	mm	
Pixel Configuration	Rectangle		
Outline Dimension	125.4(H)×99.5(V) ×0.9(D)	mm	
Weight	28.08±0.5	g	

### 1.4 Mechanical Drawing of EPD module



## 1.5 Input/Output Terminals

Pin #	Single	Description	Remark
1	NC	No connection and do not connect with other NC	Keep Open
2	GDR	This pin is N-MOS gate control.	
3	RESE	Current sense input for control loop.	
4	NC	No connection and do not connect with other NC	Keep Open
5	VSH2	Positive source voltage for Red	
6	TSCL	I2C clock for external temperature sensor	Connect to GND if not used
7	TSDA	I2C data for external temperature sensor	Connect to GND if not used
8	BS	Input interface setting.	Note 5-5
9 1	BUSY_N	This pin indicates the driver status.	Note 5-4
0 1	RST_N	Global reset pin	Note 5-3
1 1	DC	Serial communication Command/Data input	Note 5-2
2 1	CSB	Serial communication chip select.	Note 5-1
3 1	SCL	Serial communication clock input.	
4 1	SDA	Serial communication data input.	
5 1	VDDIO	IO voltage supply	
6 1	VCC	Digital/Analog power.	
7 1	VSS	Digital ground	
8 1	VDD	1.5V voltage input & output	
9 2	VPP	OTP program power (10V)	
0 2	VSH1	Positive source voltage	
1 2	VGH	Positive gate voltage	
2 2	VSL	Negative source voltage.	
3 2	VGL	Negative gate voltage.	
4	VCOM	VCOM driving voltage	

Note 1.5-1: This pin (CSB) is the chip select input connecting to the MCU. The chip is enabled for MCU communication: only when CSB is pulled LOW.

Note 1.5-2: This pin (DC) is Data/Command control pin connecting to the MCU. When the pin is pulled HIGH, the data will be interpreted as data. When the pin is pulled LOW, the data will be interpreted as command.



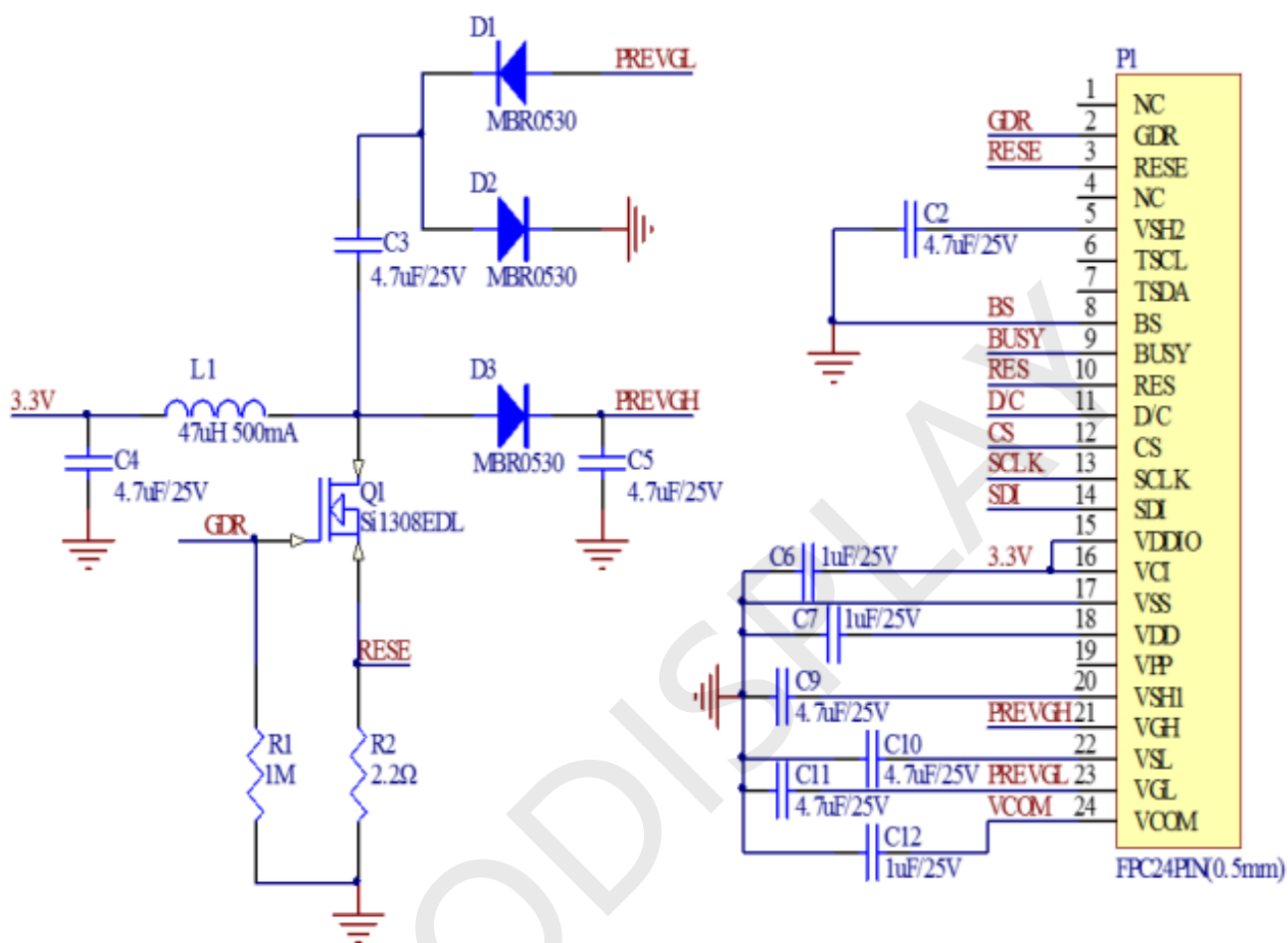
Note 1.5-3: This pin (RST\_N) is reset signal input. The Reset is active low.

Note 1.5-4: This pin (BUSY\_N) is busy state output pin. When Busy is High, the operation of chip should not be interrupted and any commands should not be issued to the module. The driver IC will put Busy pin High when the driver IC is working such as: Outputting display waveform; Communicating with digital temperature sensor

Note 1.5-5: This pin (BS) is for 3-line SPI or 4-line SPI selection. When it is "Low", 4-line SPI is selected. When it is "High", 3-line SPI (9 bits SPI) is selected.

GOODDISPLAY

### 1.6 Reference Circuit



Part Name	Requirements for spare part
C1—C12	0603/0805; X5R/X7R; Voltage Rating: $\geq 25V$
R1、R2	0603/0805; 1% variation, $\geq 0.05W$
D1—D3	MBR0530: 1) Reverse DC Voltage $\geq 30V$ 2) $I_o \geq 500mA$ 3) Forward voltage $\leq 430mV$
Q1	Si1308EDL: 1) Drain-Source breakdown voltage $\geq 30V$ 2) $V_{gs(th)} \leq 1.5V$ 3) $R_{ds(on)} \leq 400m\Omega$
L1	refer to NR3015: $I_o = 500mA(max)$
P1	24pins, 0.5mm pitch



## 1.7 Matched Development Kit

Our Development Kit designed for SPI E-paper Display aims to help users to learn how to use E-paper Display more easily. It can refresh black-white E-paper Display and three-color (black, white and red/Yellow) Good Display 's E-paper Display. And it is also added the functions of USB serial port, Raspberry Pi and LED indicator light ect. DESPI Development Kit consists of the development board and the pinboard.

More details about the Development Kit, please click to the following link:

<https://www.good-display.com/product/53/>

GOODDISPLAY

## 2. Environmental

### 2.1 Handling, Safety and Environmental Requirements

<b>WARNING</b>
----------------

<p>The display glass may break when it is dropped or bumped on a hard surface. Handle with care. Should the display break, do not touch the electrophoretic material. In case of contact with electrophoretic material, wash with water and soap.</p>
---

<b>CAUTION</b>
----------------

<p>The display module should not be exposed to harmful gases, such as acid and alkali gases, which corrode electronic components.</p>
---

<p>Disassembling the display module can cause permanent damage and invalidate the warranty agreements.</p>
--

<p>IPA solvent can only be applied on active area and the back of a glass. For the rest part, it is not allowed.</p>
--

Observe general precautions that are common to handling delicate electronic components. The glass can break and front surfaces can easily be damaged. Moreover the display is sensitive to static electricity and other rough environmental conditions.

<b>Mounting Precautions</b>
-----------------------------

<p>(1) It's recommended that you consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module.</p>
--

<p>(2) It's recommended that you attach a transparent protective plate to the surface in order to protect the EPD. Transparent protective plate should have sufficient strength in order to resist external force.</p>
--

<p>(3) You should adopt radiation structure to satisfy the temperature specification.</p>
---

<p>(4) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the PS at high temperature and the latter causes circuit break by electro-chemical reaction.</p>
---

<p>(5) Do not touch, push or rub the exposed PS with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of PS for bare hand or greasy cloth. (Some cosmetics deteriorate the PS)</p>
---

<p>(6) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach the PS. Do not use acetone, toluene and alcohol because they cause chemical damage to the PS.</p>
---

<p>(7) Wipe off saliva or water drops as soon as possible. Their long time contact with PS causes deformations and color fading.</p>
--

Product specification	The data sheet contains final product specifications.
-----------------------	---

<b>Limiting values</b>
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.
<b>Application information</b>
Where application information is given, it is advisory and does not form part of the specification.

<b>Product Environmental certification</b>
ROHS
<b>REMARK</b>
All The specifications listed in this document are guaranteed for module only. Post-assembled operation or component(s) may impact module performance or cause unexpected effect or damage and therefore listed specifications is not warranted after any Post-assembled operation.

GOODDISPLAY

## 2.2 Reliability test

	TEST	CONDITION	METHOD	REMARK
1	High-Temperature Operation	T=40°C, RH=35%RH, For 240Hr		
2	Low-Temperature Operation	T = 0°C for 240 hrs		
3	High-Temperature Storage	T=60°C RH=35%RH For 240Hr Test in white pattern		
4	Low-Temperature Storage	T = -25°C for 240 hrs Test in white pattern		
5	High Temperature, High-Humidity Operation	T=40°C, RH=90%RH, For 168Hr		
6	High Temperature, High-Humidity Storage	T=60°C, RH=80%RH, For 240Hr Test in white pattern		
7	Temperature Cycle	-25°C(30min)~70°C(30min), 50 Cycle Test in white pattern		
8	Package Vibration	1.04G, Frequency : 10~500Hz Direction : X,Y,Z Duration: 1 hours in each direction	Full packed for shipment	
9	Package Drop Impact	Drop from height of 100 cm on Concrete surface Drop sequence: 1 corner, 3edges, 6face One drop for each.	Full packed for shipment	
10	UV exposure Resistance	765 W/m <sup>2</sup> for 168hrs,40°C		

Actual EMC level to be measured on customer application.

Note1: Stay white pattern for storage and non-operation test.

Note2: Power off duration time is 30s.

Note3: The function, appearance, optical should meet the requirements of the test before and after the test.

Note4: Continue testing after 2 hours at 20C~25C°C.

### 3. Electrical Characteristics

#### 3.1 Absolute Maximum Rating

Parameter	Symbol	Rating	Unit	Humidity	Unit	Note
Logic Supply voltage	VCC,VDDIO	-0.5~6.0	V	45~70	%RH	Note 3-1
Operation temperature range	TOPR	0~50	℃	45~70	%RH	
Storage temperature range	TSTG	-25~60	℃	45~70	%RH	Note 3-2
Transportation temperature range	TTTG	-25~60	℃	45~70	%RH	Note 3-3
GND	Ground	-	-		-	Connect to Ground

**Table 3.1-1: Maximum Ratings**

Note 3-1: Maximum ratings are those values beyond which damages to the device may occur. VCC: Digital power, VDDIO: IO power. Functional operation should be restricted to the limits in the Electrical Characteristics chapter.

Note 3-2: The display effect may be affected if the product is stored for more than 10days under the environment of 40-60 degree.

Note 3-3: TTTG is the transportation condition, the transport time is within 10 days for -25℃~0℃ or 40℃~60℃

Note 3-4: The single pixel effect under the condition of above 35 degree cannot be guaranteed.

#### 3.2 DC CHARACTERISTICS

The following specifications apply for: VSS=0V, VCC=3.0V, TOPR=25±2℃.

**Table 3.2-1: DC Characteristics**

Symbol	Parameter	Test Condition	Applicable pin	Min.	Typ.	Max.	Unit
VCC	VCC operation voltage	-	VCC	2.4	3.0	3.6	V
VIH	High level input voltage	-	SDA, SCL, CS#,	0.8VDDIO	-	-	V
VIL	Low level input voltage	-	D/C#, RES#, BS1	-	-	0.2VDDIO	V
VOH	High level output voltage	IOH = -100uA	BUSY,	0.9VDDIO	-	-	V
VOL	Low level output voltage	IOL = 100uA		-	-	0.1VDDIO	V
Iupdate	Module peak current	TEMP = 25℃	-	-	25	-	mA
Isleep	Deep sleep mode	VCC=3.0V	-	-	1	3	uA

#### 3.3 Power Consumption

Parameter	Symbol	Conditions	TYP	Max	Unit	Remark
Panel power consumption during update	-	25℃	-	600	mAs	-

mAs=update average current×update time

## 4. Optical characteristics

### 4.1 Specifications

Measurements are made with that the illumination is under an angle of 45 degrees, the detection is perpendicular unless otherwise specified.

T=25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT	Note
$\Delta E$	ghosting	-	-	-	2		-
<b>BS</b>	Black State L* value		-	-	20		Note 4-1
WS	White State L* value		66	-	-		Note 4-2

Note 4-1: Luminance meter: Eye - One Pro Spectrophotometer

Note 4-2: We don't guarantee 5 years pixels display quality for humidity below 45%RH or above 70%RH; Suggest Updated once a day;

Note 4-3: To increase the black and white screen clear screen when red has refreshed for a long time, the effect is better.

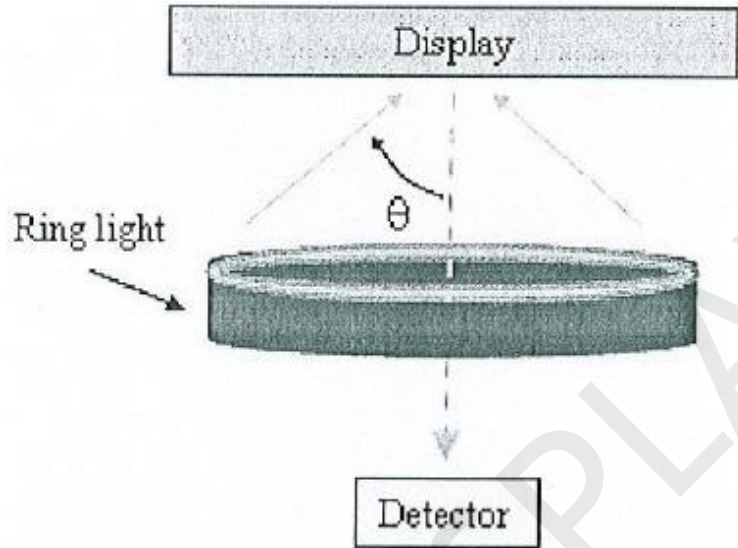
GOODDISPLAY



### 4.2 Definition of contrast ratio

The contrast ratio (CR) is the ratio between the reflectance in a full white area (Rl) and the reflectance in a dark area (Rd):

R1: white reflectance    Rd: dark reflectance     $CR = Rl/Rd$

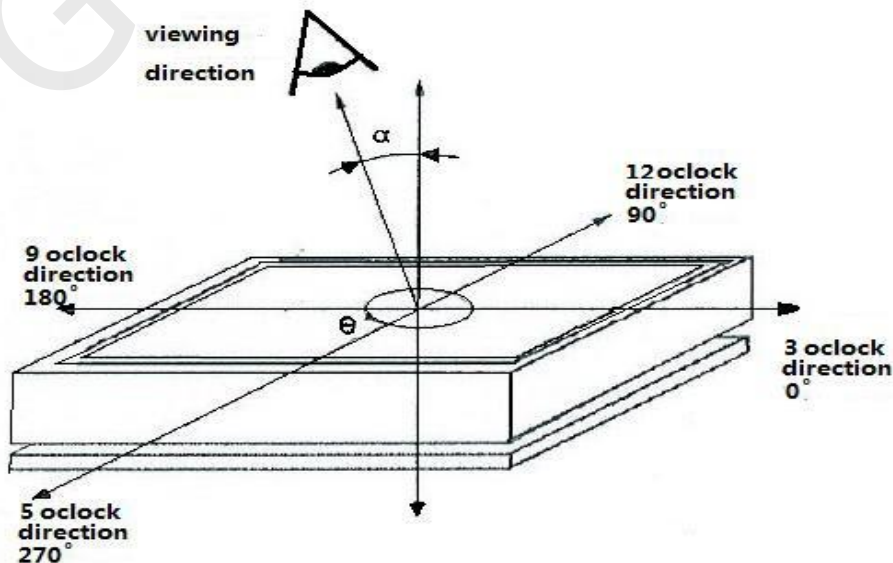


### 4.3 Reflection Ratio

The reflection ratio is expressed as:

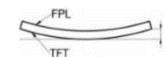
$R = \text{Reflectance Factor white board} \times (L_{\text{center}} / L_{\text{white board}})$

$L_{\text{center}}$  is the luminance measured at center in a white area ( $R=G=B=1$ ).  $L_{\text{white board}}$  is the luminance of a standard white board. Both are measured with equivalent illumination source. The viewing angle shall be no more than 2 degrees.



## 5. Point and line standard

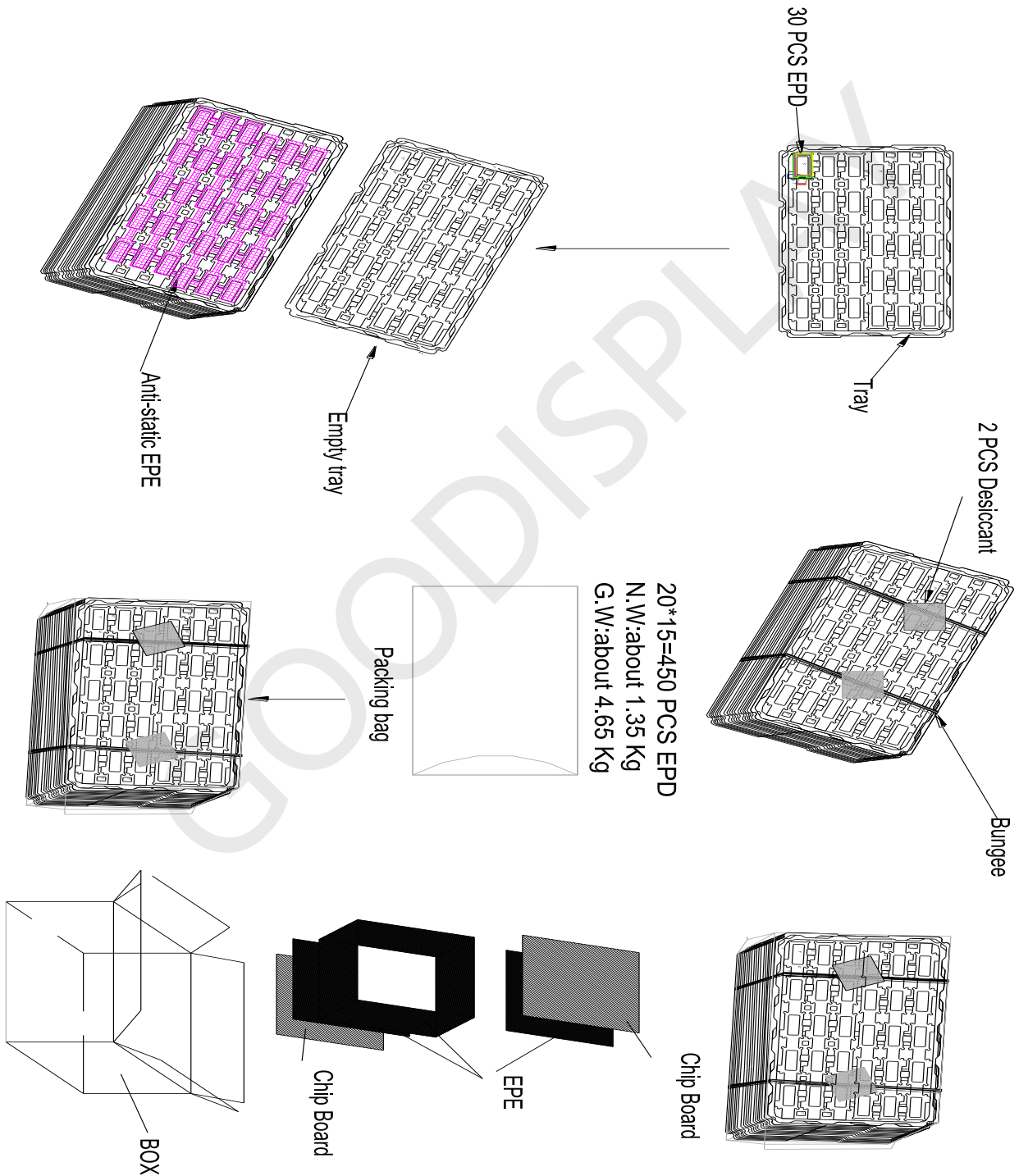
Shipment Inspection Standard						
Equipment: Electrical test fixture, Point gauge						
Outline dimension	125.4(H)×99.5(V) ×0.9 (D)	Unit: mm	Part-A	Active area	Part-B	Border area
Environment	Temperature	Humidity	illuminance 8	Distance	Time	Angle
	19°C~25°C	50±5%RH	00~1300Lux	300 mm	35Sec	45 °
Defect type	Inspection method	Standard		Part-A	Part-B	
Spot	Electric Display	D≤0.2 mm		Ignore	Ignore	
		0.2 mm < D ≤ 0.4 mm		N≤4	Ignore	
		0.4 mm < D ≤ 0.6 mm		N≤1	Ignore	
		D > 0.6 mm		Not Allow	Ignore	
Display malfunction	Electric Display	Not Allow		Not Allow	Ignore	
Display error	Electric Display	Not Allow		Not Allow	Ignore	
Scratch or line defect(include dirt)	Visual/Film card	L≤2 mm, W≤0.1 mm		Ignore	Ignore	
		2.0mm < L ≤ 9.0mm, 0.1 < W ≤ 0.2mm,		N≤2	Ignore	
		L > 9 mm, W > 0.2 mm		Not Allow	Ignore	
PS Bubble	Visual/Film card	D≤0.4mm		Ignore	Ignore	
		0.4mm < D ≤ 0.6mm		N≤4	Ignore	
		D > 0.6 mm		Not Allow	Ignore	
Corner /Edge chipping	Visual/Film card	X≤6mm, Y≤0.4mm, Do not affect the electrode circuit (Edge chipping)				
		X≤1mm, Y≤1mm, Do not affect the electrode circuit( (Corner chipping)				
TFT warping	For 1.54~7.5inch, T≤2mm; For above 7.5inch, T≤3mm					
Remark	1. Cannot be defect & failure cause by appearance defect;					
	2. Cannot be larger size cause by appearance defect;					
	L=long    W=wide    D=point size    N=Defects NO					



## 6. Packing

Full carton: 12 pcs tray with products and 1 pcs empty tray.

Last carton: less 12pcs tray with products and 1 pcs empty tray. The packager will add the right amount of EPE to box so that the added EPE' s height approximately close to the EPE height around the inside of the box.



## 7. Precautions

- (1) Do not apply pressure to the EPD panel in order to prevent damaging it.
- (2) Do not connect or disconnect the interface connector while the EPD panel is in operation.
- (3) Do not touch IC bonding area. It may scratch TFT lead or damage IC function.
- (4) Please be mindful of moisture to avoid its penetration into the EPD panel, which may cause damage during operation.
- (5) If the EPD Panel / Module is not refreshed every 24 hours, a phenomena known as "Ghosting" or "Image Sticking" may occur. It is recommended to refreshed the ESL / EPD Tag every 24 hours in use case. It is recommended that customer ships or stores the ESL / EPD Tag with a completely white image to avoid this issue
- (6) High temperature, high humidity, sunlight or fluorescent light may degrade the EPD panel's performance. Please do not expose the unprotected EPD panel to high temperature, high humidity, sunlight, or fluorescent for long periods of time.
- (7) For more precautions, please click on the link:  
<https://www.good-display.com/news/80.html>