



File Name	Specification For 5.9" EPD	Module Number	HINK-T059A01
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Specification For 5.9"EPD

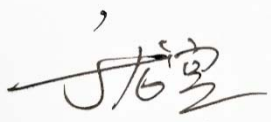
Model NO.: HINK-T059A01

Product VER: A0

Customer Approval

Customer	
Approval By	
Date Of Approval	

It will be agreed by the receiver, if not sign back the Specification within 15days.

Prepared By	Checked By	Approval By
		



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Version	Content	Date	Producer
A0	New release	2026/01/04	WXB



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1. General Description

T059A01 is an Active Matrix Electrophoretic Display (AMEPD), with interface and a reference system design. The 5.9" active area contains 680×960 pixels, and has 3-bit B/W/R/Y/B/G 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.

2. Features

- 680*960 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
- 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

3. Application

Photo Frame



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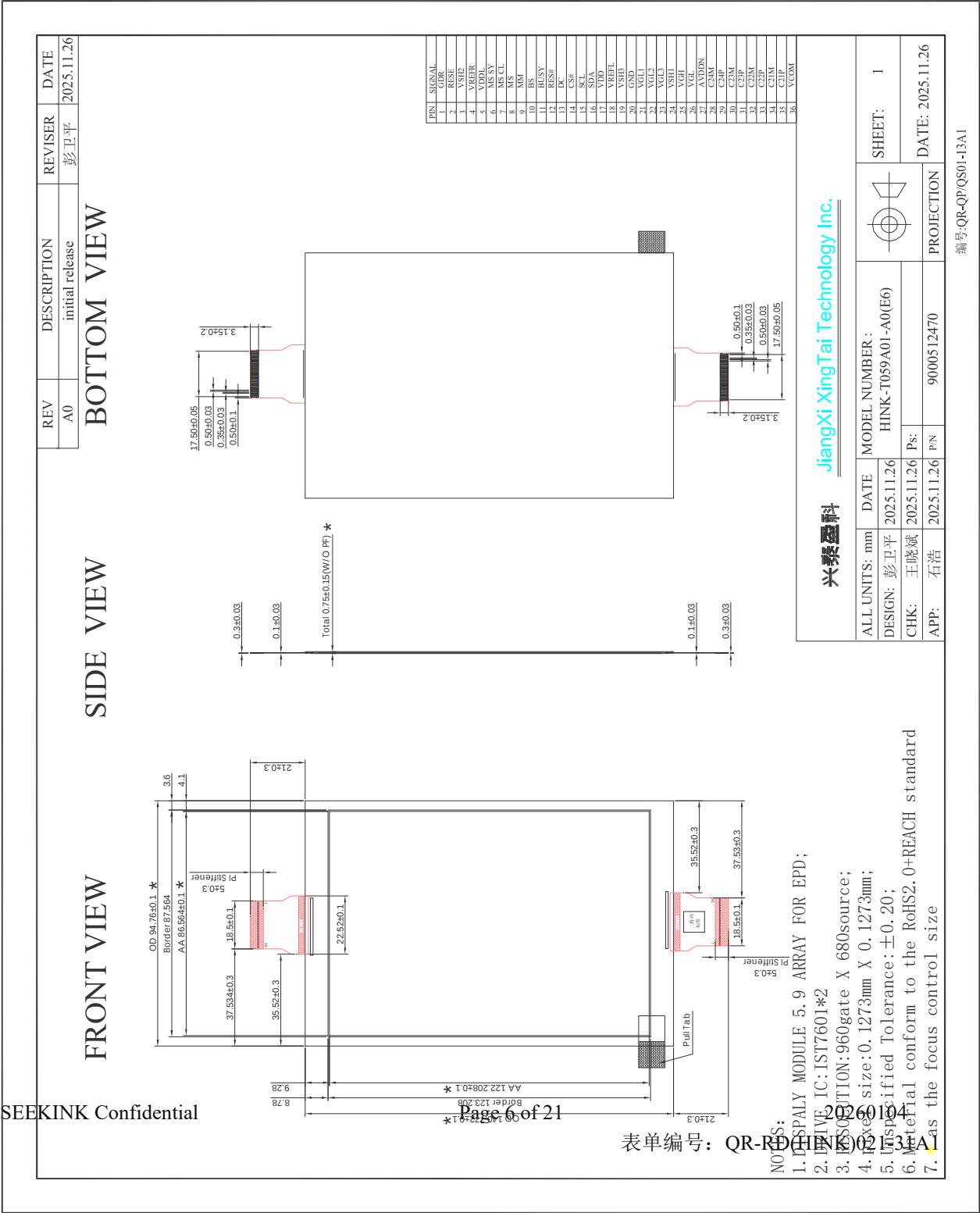
4. Mechanical Specifications

Parameter	Specifications	Unit	Remark
Screen Size	5.9	Inch	
Display Resolution	680(H)×960(V)	Pixel	Dpi:199
Active Area	86.564(H)×122.208(V)	mm	
Pixel Pitch	0.1273×0.1273	mm	
Pixel Configuration	Rectangle		
Outline Dimension	94.76(H)×140.772(V) ×0.75(D)	mm	Without masking film
IC	7601*2		
Weight	21±0.5	g	



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5. Mechanical Drawing of EPD module





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6. Input/output Terminals

Pin #	Single	Description	Remark
1	GDR	N-MOS gate control, for booster circuit output.	
2	RESE	Current sense input for control loop	
3	VSH2	Positive source driver Voltage	
4	VREFR	Digital power	
5	VDDL	Digital power	
6	MS_SY		
7	MS_CL		
8	MS	Main IC connected to high , Follow IC connected to low	Note 6-6
9	MM	Main IC connected to high , Follow IC connected to low	Note 6-6
10	BS	Bus Selection. Select 3-wire / 4-wire SPI interface. L: 4-wire interface. H: 3-wire interface.	Note 6-5
11	BUSY	Driver busy flag. L: Driver is Busy. H: Host side can send command/data to driver	Note 6-4
12	RES#	Global reset pin	Note 6-3
13	DC	Serial communication Command/Data input	Note 6-2
14	CS#	Serial communication chip select.	Note 6-1
15	SCL	Serial communication clock input	
16	SDA	Serial communication data input/output	
17	VDD	Digital power	
18	VREFL	Digital power	
19	VSH3	Positive source driver Voltage	
20	GND		
21	VSL1	Negative source driver voltage	
22	VSL2	Negative source driver voltage	
23	VSL3	Negative source driver voltage	
24	VSH1	Positive source driver Voltage	



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25	VGH	Positive Gate driving voltage	
26	VGL	Negative Gate voltage.	
27	AVDDN	Charge Pump voltage	
28	C24M	Digital power	
29	C24P	Digital power	
30	C23M	Digital power	
31	C23P	Digital power	
32	C22M	Digital power	
33	C22P	Digital power	
34	C21M	Digital power	
35	C21P	Digital power	
36	VCOM	VCOM output	

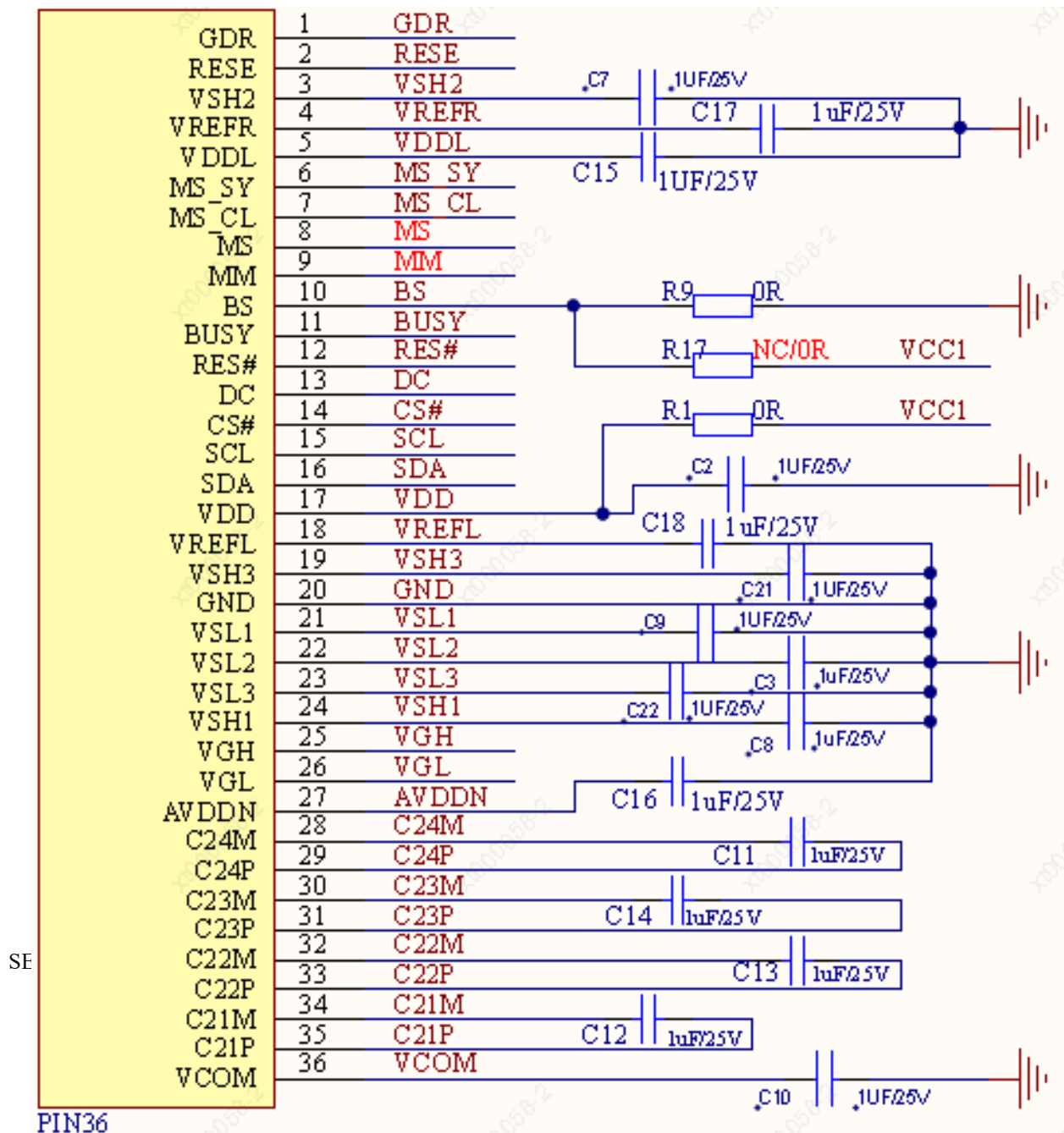
1. Note 6-1: This pin (CSB) is the chip select input connecting to the MCU. The chip is enabled for MCU communication: only when CSB is pulled LOW.
2. Note 6-2: This pin (DC) is Data/Command control pin connecting to the MCU. When the pin is pulled HIGH, the data will be interpreted as data. When the pin is pulled LOW, the data will be interpreted as command.
3. Note 6-3: This pin (RES#) is reset signal input. The Reset is active low.
4. Note 6-4: 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
5. Note 6-6: 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.
6. Note 6-6: Your main control chip needs to be divided into master and slave;
This pin8/pin9 (MS And MM) Master IC connected to high , Slave IC connected to low .



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7. Reference Circuit

According to the following circuit design, Distinguish between master and slave circuit designs, the main control chip needs to be divided into master and slave control; This pin8/pin9 (MS And MM) Master IC connected to high , Slave IC connected to low .





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Figure. 9-1

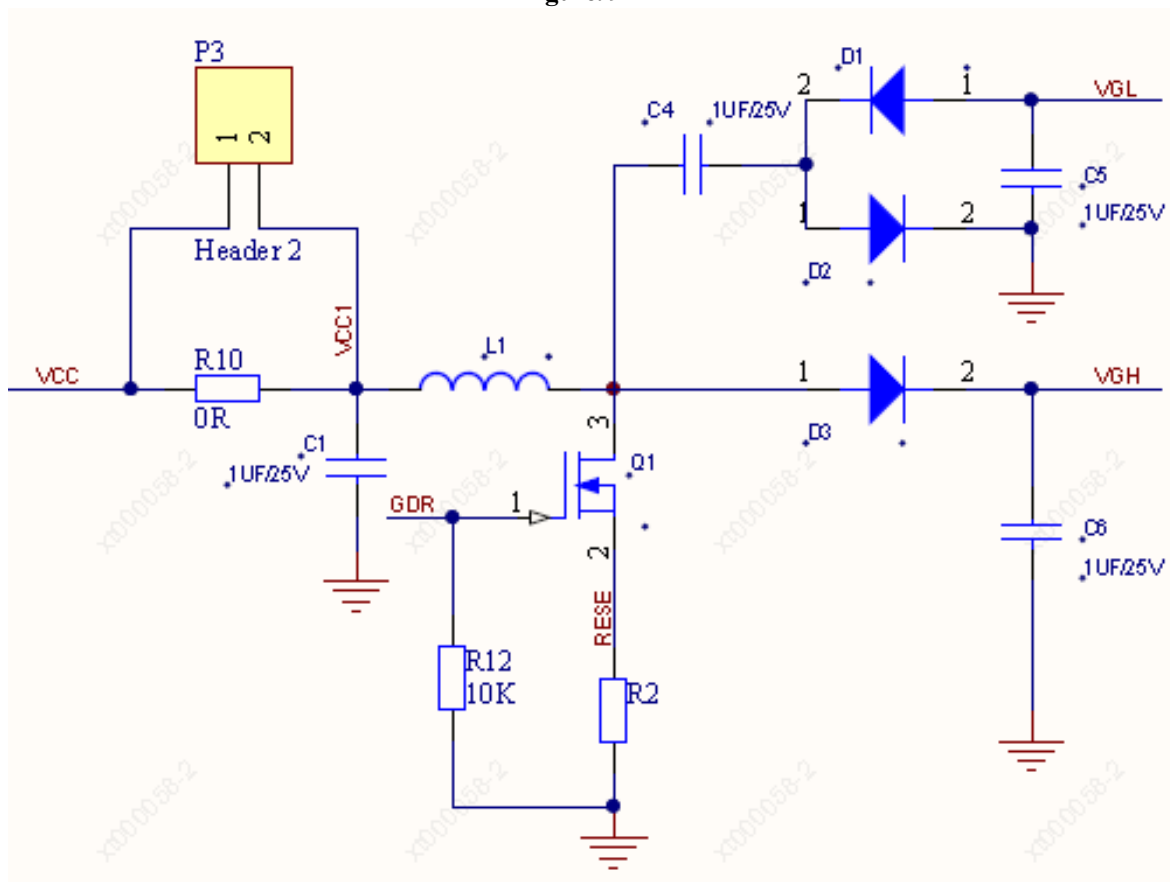


Figure. 9-2

Part Name	Value	IST7601 /Reference Part
C1—C18 ; C21-C22	1uF	0603;X5R;Voltage Rating: 25V
D1—D3	MBR0530	MBR0530 1) Reverse DC voltage $\geq 30V$ 2) $I_o \geq 500mA$ 3) Forward voltage $\leq 430mV$



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R2	2.2ohm	2.2Ω/0603/1% variation
Q1	MOS	Si1304BDL/NX3008NBK: 1) Drain-Source breakdown voltage $\geq 30V$ 2) $V_{gs(th)} = 0.9V$ (Typ), 1.3V (Max) 3) $R_{ds\ on} \leq 2.1\ \Omega$ @ $V_{gs} = 2.5V$
L1	47uH	NRH3010T100MN/NRH3010T470MN

8. Absolute Maximum Rating

Symbol	Parameter	Rating	Unit	Humidity	Unit	Note
V _{DD}	Logic supply voltage	-0.3 to +6.0	V	-	-	
T _{OPR}	Operation temperature range	0 to 50	°C	45 to 70	%	
T _{ttg}	Transportation temperature range	-25 to 50	°C	45 to 70	-	Note11-2
T _{stg}	Storage condition	-25 to 50	°C	45 to 70	%	Maximum storage time: 5 years

Note 11-1: We guarantee the single pixel display quality for 0-35°C, but we only guarantee the barcode readable for 35-40°C. Normal use is recommended to refresh every 24 hours.

Note11-2: Maximum ratings are those values beyond which damages to the device may occur. Functional operation should be restricted to the limits in the Electrical Characteristics chapter.

Note11-3: T_{ttg} is the transportation condition, the transport time is within 10 days for -25°C~0°C or 50°C~60°C

Note 11-4: When the Seven-color product is stored. The display screen should be kept white and face up. We suggest that the full black and full white picture could be added to clear the screen after the module is refreshed for a long time, the display effect would be better. We don't guarantee the display effects of these ten font colors: white background with yellow, white background with green, blue background with yellow, blue background with green, yellow background with white, yellow background with blue, yellow background with green, green background with white, green background with yellow, and green background with blue.

Note 11-5: Due to the nature of FPL, we will not control the display effect of yellow and white characters on white and yellow characters on white.

9. DC Characteristics

The following specifications apply for: V_{SS}=0V, V_{DD}=3.0V, T_{OPR}=25°C

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V _{DD}	V _{DD} operation voltage	-	2.4	3.0	3.6	V
V _{IH}	High level input voltage	-	0.7xV _{IO}	-	V _{IO}	V
V _{IL}	Low level input voltage	-	GND	-	0.3xV _{DD}	V
V _{OH}	High level output voltage	I _{OH} = 400μA	V _{IO} -0.4	-	-	V



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Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
VOL	Low level output voltage	IOL = -400μA	GND	-	GND+0.4	V
Iupdate	Module operating current	-	-	TBD	-	mA
Isleep	Deep sleep mode	VCI=3.3V	-	TBD	-	uA

- The Typical power consumption is measured using associated 25°C waveform with following pattern transition: from horizontal scan pattern to vertical scan pattern. (Note 12-)

- The listed electrical/optical characteristics are only guaranteed under the controller & waveform provided by XingTai.

Note 12-1

The Typical power consumption

10. Power Consumption (Price tag screen)

Parameter	Symbol	Conditions	TYP	Max	Unit	Remark
Panel power consumption during update	-	25°C	TBD		mAs	-
Deep sleep mode	-	25°C	TBD		uA	-

mAs=update average current×update time

11. Optical characteristics

11.1 Optical Measurement Conditions

Item	Symbol	Value	Unit	Note
Ambient Temperature	Ta	25±2	°C	Indoor testing
Ambient Humidity	Ha	50±5	%RH	-
Supply Voltage	VCC, VDDIO	3.0	V	-
illuminance	-	800~1300	Lux	

Note 11-1: Image is updated with above condition



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11.2. Optical characteristics

T=25°C ,VDD=3.3V

E6 (EPD) waveform tuning Optical standard													
Temperature (℃)		0~4	5~9	10~14	15~19	20~24	25~29	30~34	35~39	40~44	45~50	ΔE 2000 客户标准	1A1B残影 标准
White state	TYP L*	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66	65	<5	<2
	TYP a*	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4		
	TYP b*	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2		
Dark State	TYP L*	10	10	10	10	10	10	10	10	10	10	<5	<3
	TYP a*	10	10	10	10	10	10	10	10	10	10		
	TYP b*	-13	-12	-12	-12	-12	-12	-12	-12	-12	-12		
Red State	TYP L*	25	25	25	25	26	26	25	25	25	25	<5	<2
	TYP a*	39	40	40	40	41	41	40	40	40	40		
	TYP b*	29	30	30	30	30	30	30	30	30	30		
Yellow state	TYP L*	65	65	65	65	65	65	65	65	65	65	<5	<2
	TYP a*	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12		
	TYP b*	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5		
Blue State	TYP L*	30	30	30	30	30	30	30	30	30	30	<5	<2
	TYP a*	6	6	6	6	6	6	6	6	6	5		
	TYP b*	-40	-40	-40	-40	-39	-39	-38	-36	-35	-33		
Green State	TYP L*	34	34	34	34	35	35	35	35	33	33	<7	<3
	TYP a*	-19	-23	-23	-23	-24	-24	-24	-24	-24	-23		
	TYP b*	7	7	7	7	7	7	7	7	7	7		

WS : White state, KS : Black State,

Note 12-1 : Luminance meter : i - One Pro Spectrophotometer

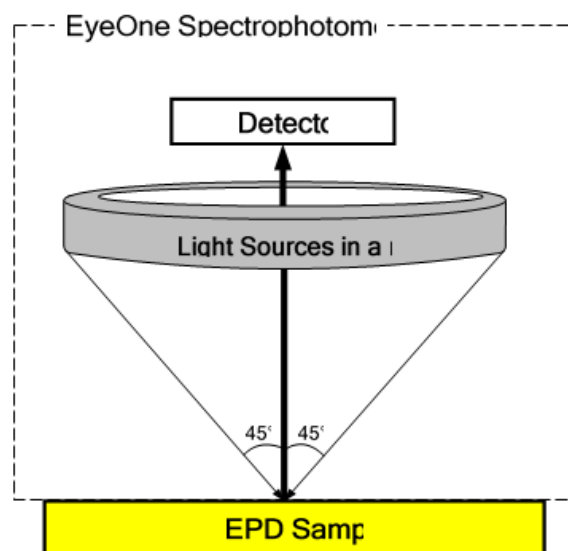


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11.2 Definition of contrast ratio

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

$$CR = Rl/Rd$$





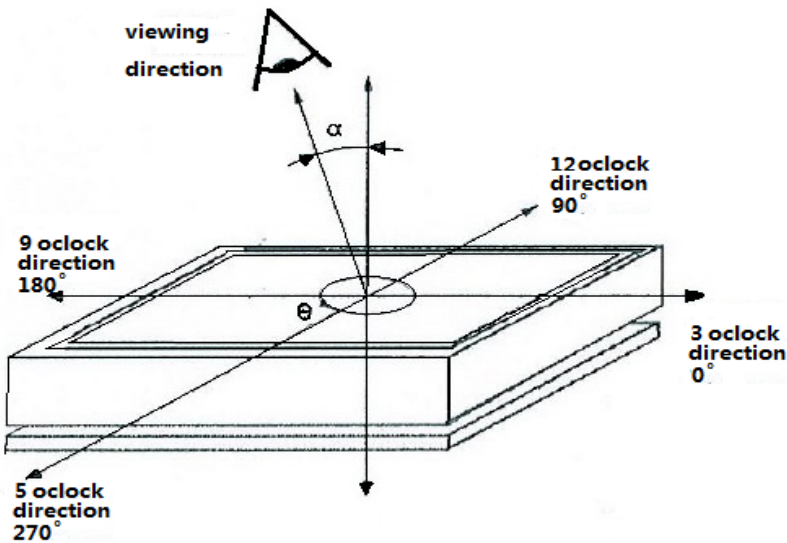
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11.4 Reflection Ratio

The reflection ratio is expressed as:
 $R = \text{Reflectance Factor white board} \times (\text{L center} / \text{L white board})$
L center is the luminance measured at center in a white area (R=G =B=1). L 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.

12. Handling

The display module should not be used for continual flexing or bending with the leaked materials.
The display module should not be used with electronic components.
Disassembling the display module is not allowed.
IPA solvent can only be used for cleaning the display module.



It should not be used for contact with the display module. In case of contact, it should be cleaned immediately.



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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.

Mounting Precautions

- (1) It's recommended that you consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module.
- (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.
- (3) You should adopt radiation structure to satisfy the temperature specification.
- (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.
- (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)
- (6) When there is dust on the surface, gently wipe it with absorbent cotton or a dust-free cloth. It is recommended to use anhydrous ethanol to clean the adhesive used to attach PS.
- (7) Wipe off saliva or water drops as soon as possible. Their long time contact with PS causes deformations and color fading.

Data sheet status

Product specification	The data sheet contains final product specifications.
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Limiting values

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.

Application information

Where application information is given, it is advisory and does not form part of the specification.

Product Environmental certification

ROHS



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REMARK

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.

13. Reliability test

13.1 Reliability test items

	TEST	CONDITION	REMARK
1	High-Temperature Operation	T=40°C, RH=35%RH, For 240Hrs	
2	Low-Temperature Operation	T = 0°C for 240 hrs	
3	High-Temperature Storage	T=50°C RH=35%RH For 240Hrs	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 168Hrs	
6	High Temperature, High-Humidity Storage	T=50°C, RH=90%RH, For 240Hrs	Test in white pattern
7	Temperature Cycle	-25°C(30min)~60°C(30min), 100 Cycle	Test in white pattern
8	Package Vibration	1.04G,Frequency : 20~200Hz Direction : X,Y,Z Duration: 30 minutes in each direction	Full packed for shipment



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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 ² for 168hrs,40°C	
11	Electrostatic Discharge(no-operation)	(Machine model) :+/-200v, 0Ω,200PF	

Actual EMC level to be measured on customer application.

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

Note2: Operation is black/white pattern , hold time is 150S.

Note3: Keep testing after 2 hours placing at 20°C-25°C.

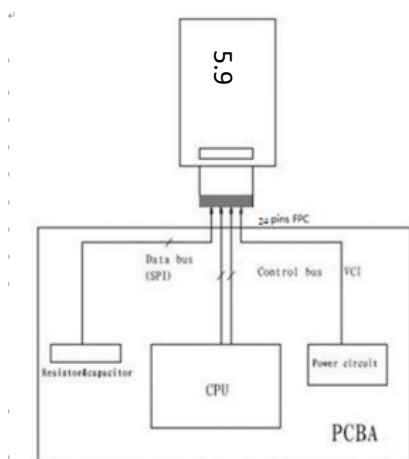
13.2 Product life time

The EPD Module is designed for a 5 -year life-time with 20 °C/60%RH operation assumption. Reliability estimation testing with accelerated life-time theory would be demonstrated to provide confidence of EPD lifetime.

13.3 Product warranty

Warranty conditions have to be negotiated between Xingtai and individual customers. Xingtai provides 12+1(one month delivery time) months warranty for all products which are purchased from Xingtai.

14. Block Diagram



15. Shipment inspection specification



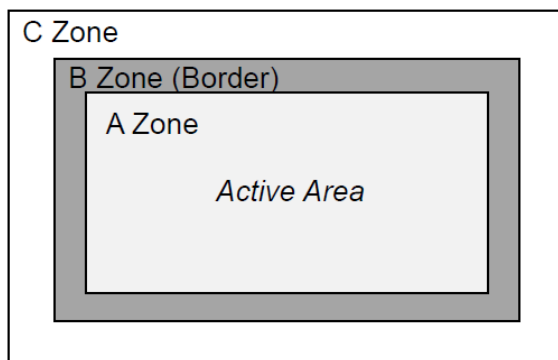
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15.1 Zone Definition

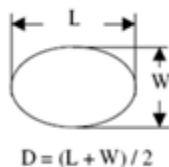
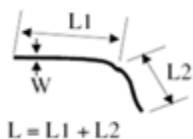
A Zone: Active Area

B Zone: Border Area

C Zone: From B Zone edge to panel edge



15.2 Line/Spot defect size

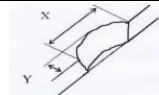
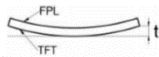


15.3 Point and line standard

Shipment Inspection Standard						
Equipment: Electrical test fixture, Point gauge						
Outline dimension	94.76(H)×140.772(V) ×0.75(D)	Unit: mm	Part-A	Active area	Part-B	Border area
Environment	Temperature	Humidity	illuminance	Distance	Time	Angle
	19°C~25°C	50±5%RH	800~1300Lux	300 mm	35Sec	45°
Defect type	Inspection method	Standard		Part-A	Part-B	
Spot	Electric Display	D≤0.25 mm		Ignore	Ignore	



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		0.25 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≤0.2 mm	Ignore	Ignore
		2.0mm<L≤9.0mm,0.2<W≤0.3mm,	N≤2	Ignore
		L>9 mm,W>0.3 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≤8mm,Y≤1mm, Do not affect the electrode circuit (Edge chipping)		
		X≤8mm,Y≤8mm, Do not affect the electrode circuit((Corner chipping)		
		Ignore		
		 		
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			

15.4 Barcode



FF

ABBBBBBBBBB

CCCDDDEEEE

What is the QR code after picture being scanned and read? It consist of 30 numbers and letters, here is explanation for it.



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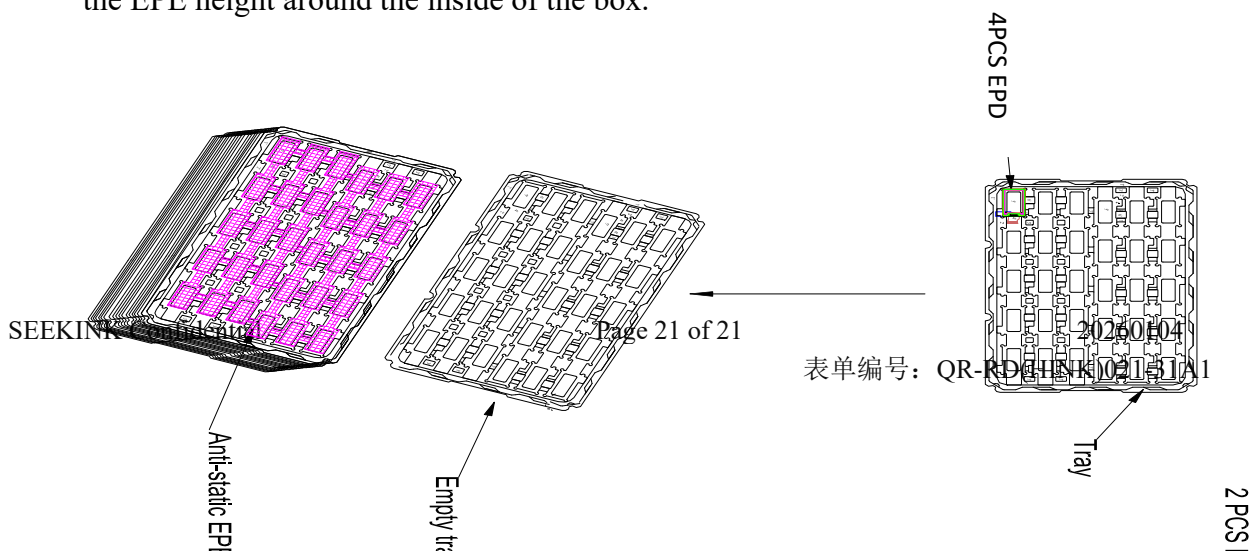
QR Code: ABBBBBBBBBBFFCCCDDDEEEEGHIJKLL

- ① A means Factory code, e.g.: H (HINK)
- ② BBBBBBBBBB refers to product model name, which is in consistent with specification part number. E.g.: E0213A189 or E0266A120; when the total code is less than 9, it would be added suffix with **. e.g.: E027A45** or E0154A78*
- ③ FF means production workshop
- ④ CCC means date of production
- ⑤ DDD means production batch
- ⑥ EEEE means FPL lot
- ⑦ G means MP/Sample/Trial/Repair
- ⑧ HIJ:(H——TFT;I——PS;J——EC Glue)
- ⑨ KK means IC type
- ⑩ LL means serial number

16. 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.





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4*12=48PCS EPD
N.W: About 1.224kg
G.W: About 4.218kg