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Specification For 1.8"EPD

Model NO.: E018A11

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
周涛涛	文伟	王浩



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Version	Content	Date	Producer
A0	New release	2025/1/10	Leslie



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1. General Description

HINK-E018A11 is an Active Matrix Electrophoretic Display (AMEPD), with interface and a reference system design. The 1.8" active area contains 224×168 pixels, and has 1-bit B/W/R/Y 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

- 224*168pixels display
- High contrast High reflectance
- Ultra wide viewing angle
- Ultra low power consumption
- Pure reflective mode
- Bi-stable display
- Commercial temperature range
- 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

Electronic Shelf Label System



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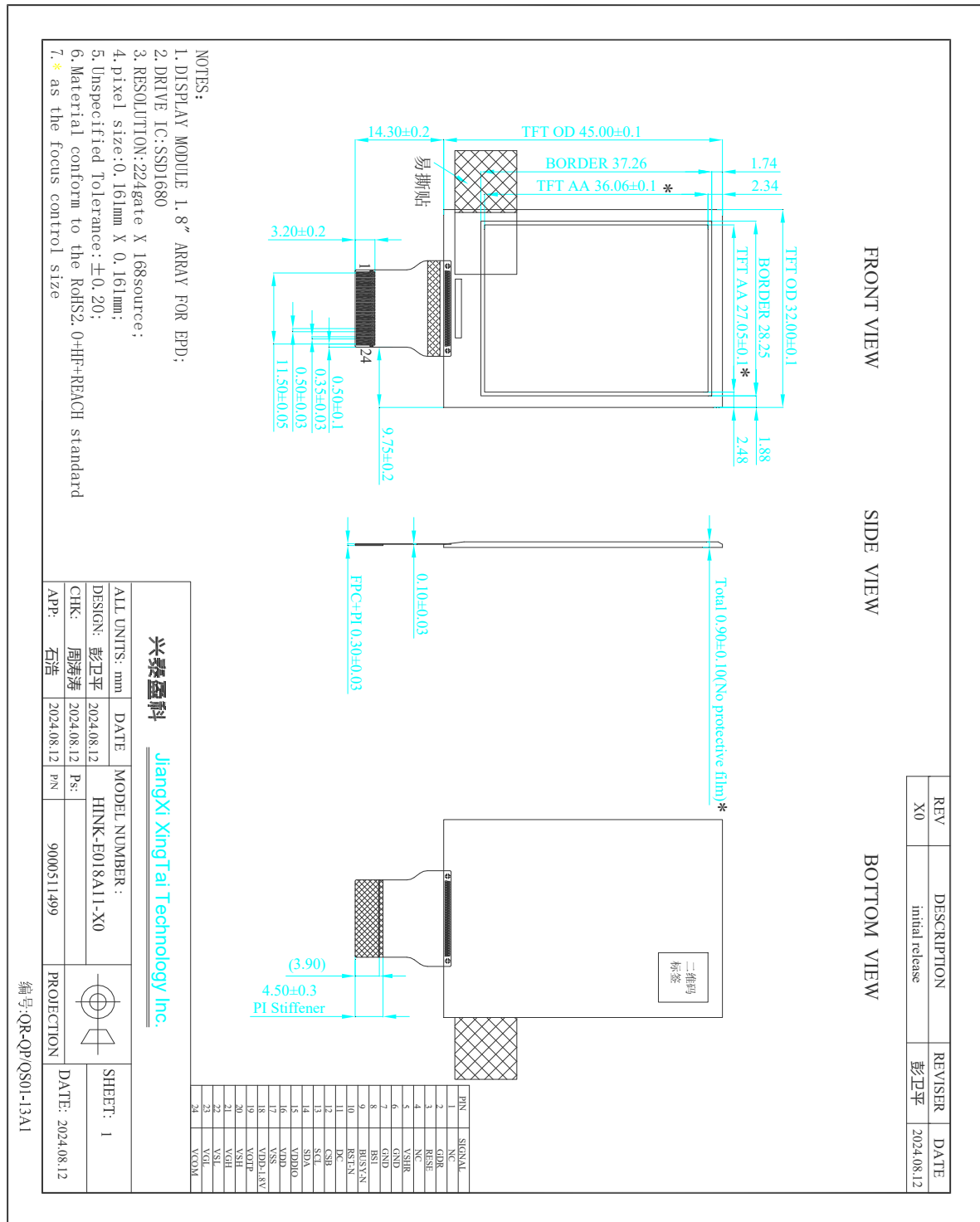
4. Mechanical Specifications+

Parameter	Specifications	Unit	Remark
Screen Size	1.8	Inch	
Display Resolution	224(H)×168(V)	Pixel	Dpi:158
Active Area	27.05(H)×36.06(V)	mm	
Pixel Pitch	0.161×0.161	mm	
Pixel Configuration	Rectangle		
Outline Dimension	45(H)×32 (V) ×0.9(D)	mm	Without masking film
Weight	TBD	g	



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5. Mechanical Drawing of EPD module





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6. Input/output Terminals

Pin #	Single	Description	Remark
1	NC	No connection and do not connect with other NC pins	Keep Open
2	GDR	N-Channel MOSFET Gate Drive Control	
3	RESE	Current Sense Input for the Control Loop	
4	NC	No connection and do not connect with other NC pins	Keep Open
5	VDHR	Positive Source driving voltage	
6	GND		Note 6-6
7	GND		Note 6-6
8	BS	Bus selection pin	Note 6-5
9	BUSY_N	Busy state output pin	Note 6-4
10	RST_N	Reset	Note 6-3
11	DC	Data /Command control pin	Note 6-2
12	CSB	Chip Select input pin	Note 6-1
13	SCL	serial clock pin (SPI)	
14	SDA	serial data pin (SPI)	
15	VDDIO	Power for interface logic pins	
16	VDD	Power Supply pin for the chip	
17	GND	Ground	
18	VDDD	Core logic power pin	
19	VPP	Power Supply for OTP Programming	
20	VSH	Positive source driver Voltage	
21	VGH	Positive Gate driving voltage	
22	VSL	Negative Source driving voltage	
23	VGL	Negative Gate voltage.	
24	VCOM	VCOM driving voltage	

Note 6-1: This pin (CS#) is the chip select input connecting to the MCU. The chip is enabled for MCU communication: only when CS# is pulled LOW.

Note 6-2: This pin (D/C#) 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



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pulled LOW, the data will be interpreted as command.

Note 6-3: This pin (RES#) is reset signal input. The Reset is active low.

Note 6-4: This pin (BUSY) is Busy state output pin. When Busy is Low ,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 Low when the driver IC is working such as:

- Outputting display waveform; or
- Communicating with digital temperature sensor

Note 6-5: This pin (BS1) 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.

Note 6-6: If customer don't want to use external temperature sensors,please make TSCL and TSDA to be ground ,not NC.



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7. Reference Circuit

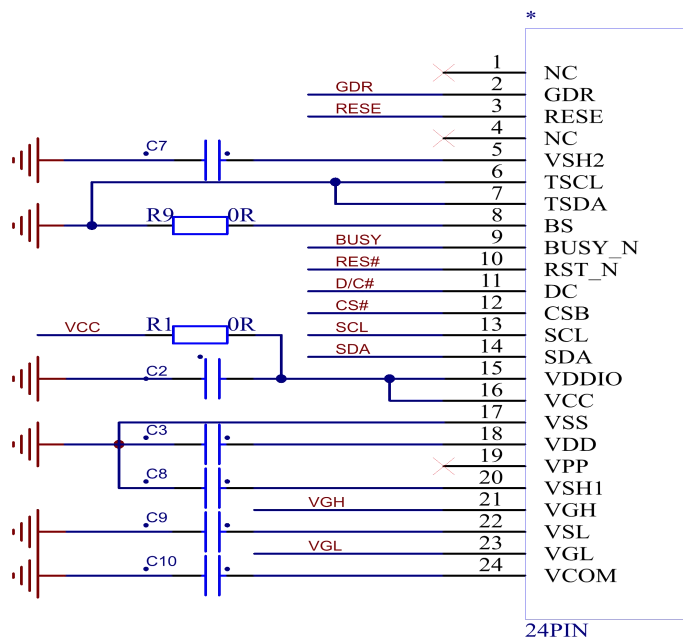


Figure. 9-1

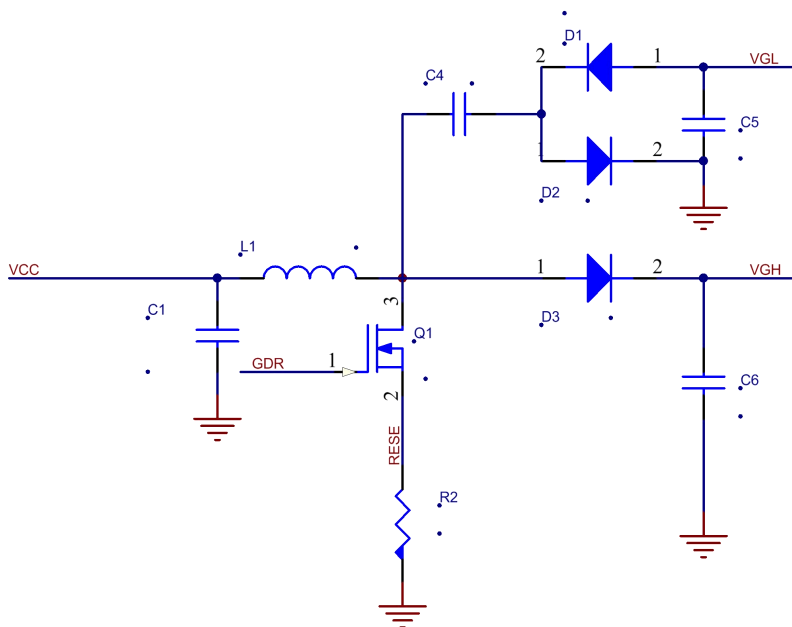


Figure. 9-2



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Part Name	Value /requirement/Reference Part		
C1—C10	1uF/0603;X5R/X7R;Voltage Rating: 25V		
C10	1uF/0603;X7R;Voltage Rating: 25V		
D1—D3	MBR0530 1) Reverse DC voltage $\geq 30V$ 2) Forward current $\geq 500mA$ 3) Forward voltage $\leq 430mV$		
R2	2.2 Ω /0603: 1% variation		
Q1	NMOS:Si1304BDL/NX3008NBK 1) Drain-Source breakdown voltage $\geq 30V$ 2) $V_{gs(th)} = 0.9 (Typ), 1.3V (Max)$ 3) $R_{ds(on)} \leq 2.1\Omega @ V_{gs}=2.5V$		
L1	47uH/CDRH2D18、LDNP-470NC Maximum DC current~420mA Maximum DC resistance~650m Ω		
CON24Pin	24Pins,0.5mm pitch ZIF Socket		



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8. Absolute Maximum Rating

Parameter	Symbol	Rating	Unit	Humidity	Unit	Note
Logic Supply voltage	VCC,VDDIO	-0.5~6.0	V	45~70	%RH	Note 8-1
Operation temperature range	TOPR	0~40	°C	45~70	%RH	
Storage temperature range	TSTG	-25~50	°C	45~70	%RH	Note 8-2
Transportation temperature range	TTTG	-25~50	°C	45~70	%RH	Note 8-3
GND	Ground	-	-		-	Connect to Ground

Note 8-1: 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 8-2: The display effect may be affected if the product is stored for more than 10days under the environment of 40-60 degree.

Note 8-3: The single pixel effect under the condition of above 35 degree cannot be guaranteed. It is recommended to swipe the screen once every 24 hours

9. DC Characteristics

The following specifications apply for: VSS=0V, VDD=3.0V, TOPR=25°C

Symbol	Parameter	Test Condition	Applicable pin	Min.	Typ.	Max.	Unit
VCC	VCC operation voltage	-	VCC	2.3	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	-	-	-	-	8	mA
Isleep	Deep sleep mode	VCC=3.0V	-	-		3	uA

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

- VCOM value will be OTP before in factory.

10. Power Consumption (Price tag screen)

Parameter	Symbol	Conditions	TYP	Max	Unit	Remark
-----------	--------	------------	-----	-----	------	--------



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Panel power consumption during update	-	25°C		80	mAs	-

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

11.2. Optical characteristics

WS: White state, BS: Black state, RS: Red state

Note 11-2: Luminance meter: Eye - One Pro Spectrophotometer

Note 11-3: We don't guarantee 3 years pixels display quality for humidity below 45%RH or above 70%RH; Suggest Updated once a day;

Note 11-4: To increase the black and white screen clear screen when red has refreshed for a long time, the effect is better.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT	Note
△E	ghosting	-	-	-	2		-
BS	Black State L* value		-	-	20		Note 11-2
WS	White State L* value		66	-	-		Note 11-2

WS : White state, KS : Black State,

Note 15-1 : Luminance meter : i - One Pro Spectrophotometer

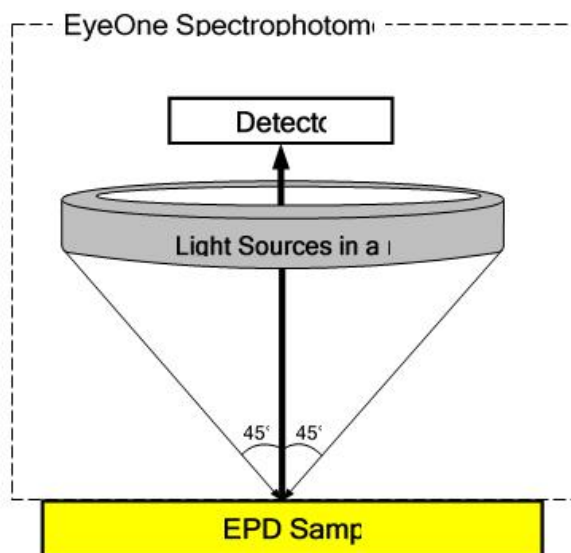


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11.2 Definition of contrast ratio

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

$$CR = Rl/Rd$$

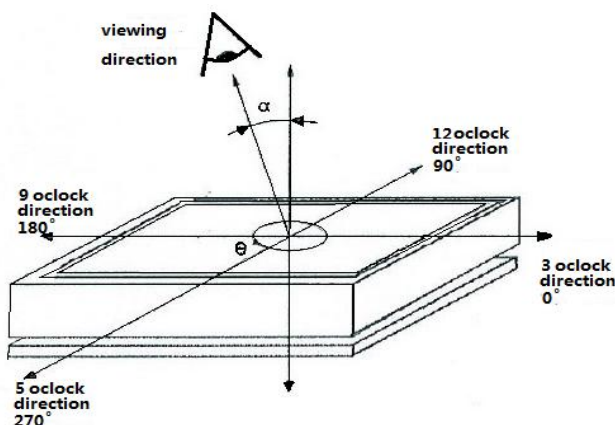


11.4 Reflection Ratio

The reflection ratio is expressed as:

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

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.





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12. Handling Safety And Environmental Requirements

WARNING
The display module should be kept flat or fixed to a rigid, curved support with limited bending along the long axis. It should not be used for continual flexing and bending. Handle with care. Should the display break do not touch any material that leaks out. In case of contact with the leaked material then wash with water and soap.

CAUTION
The display module should not be exposed to harmful gases, such as acid and alkali gases, which corrode electronic components.
Disassembling the display module can cause permanent damage and invalidate the warranty agreements.
IPA solvent can only be applied on active area and the back of a glass. For the rest part, it is not allowed.
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 dose not form part of the specification.

Product Environmental certification

ROHS

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.



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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
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: +/-250V,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 3 -year life-time with 25 °C/50%RH operation assumption. Reliability estimation testing with accelerated life-time theory would be demonstrated to provide confidence of EPD lifetime.

13.3 Product warranty

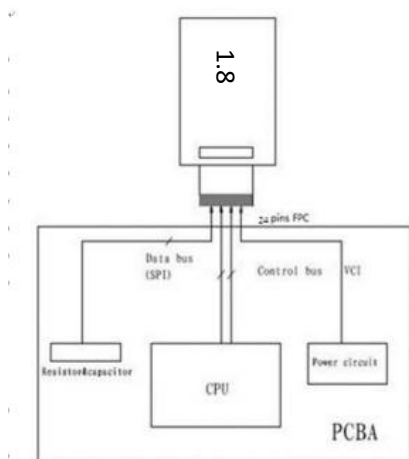
Warranty conditions have to be negotiated between Xingtai and individual customers.

Xingtai provides 12+1(one month delivery time) months warranty for all products which are purchased from Xingtai.



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14. Block Diagram



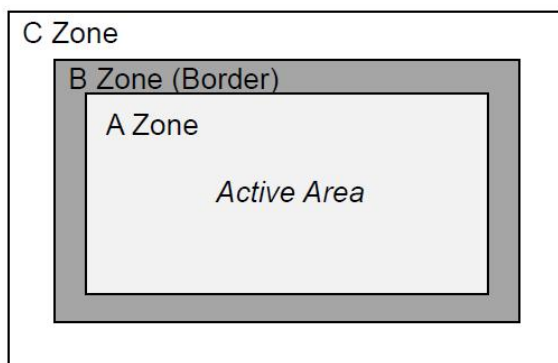
15. Shipment inspection specification

15.1 Zone Definition

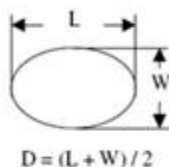
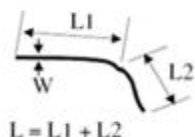
A Zone: Active Area

B Zone: Border Area

C Zone: From B Zone edge to panel edge



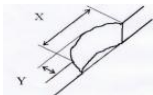
15.2 Line/Spot defect size





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15.3 Point and line standard

Shipment Inspection Standard						
Equipment: Electrical test fixture, Point gauge						
Outline dimension	45(H)×32 (V) ×0.9(D)	Unit: mm	Part-A	Active area	Part-B	Border area
Environment	Temperature	Humidity	illuminance	Distance	Time	Angle
	19℃～25℃	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	
		0.25 mm<D≤0.4 mm		N≤4	Ignore	
		D>0.4 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≤5.0mm,0.2<W≤0.3mm,		N≤2	Ignore	
		L>5 mm,W>0.3 mm		Not Allow	Ignore	
PS Bubble	Visual/Film card	D≤0.2mm		Ignore	Ignore	
		0.2mm≤D≤0.35mm		N≤4	Ignore	
		D>0.35 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)				
		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					



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15.4 Barcode



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

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



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16. Packing

Full carton: 36 pcs tray with products and 1 pcs empty tray.

Last carton: less 12 pcs 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.

