

PRODUCT SPECIFICATION

MODEL: UE156FH-RH30-L001

<◇>PRELIMINARY SPECIFICATION

<◆>APPROVAL SPECIFICATION

CUSTOMER
APPROVED BY
DATE:

DESIGNED	CHECKED	APPROVED

REVISION STATUS

Version	Revise Date	Page	Content	Modified by
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SHENZHEN VIEWE TECHNOLOGY CO., LTD

TABLE OF CONTENTS

No.	CONTENTS	PAGE
	REVISION STATUS.....	2
	TABLE OF CONTENTS	3
1.	GENERAL DESCRIPTION.....	4
2.	MECHANICAL SPECIFICATION	5
3.	PIN DESCRIPTION.....	6
4.	ELECTRICAL CHARACTERISTICS	7
5.	INPUT SIGNAL TIMING.....	8
6.	OPTICAL CHARACTERISTICS.....	10
7.	RELIABILITY TEST ITEMS.....	13
8.	GENERAL PRECAUTION	14
9.	PACKAGE DRAWING	15
10.	THE FOREIGN STANDARDS.....	16

1. GENERAL DESCRIPTION

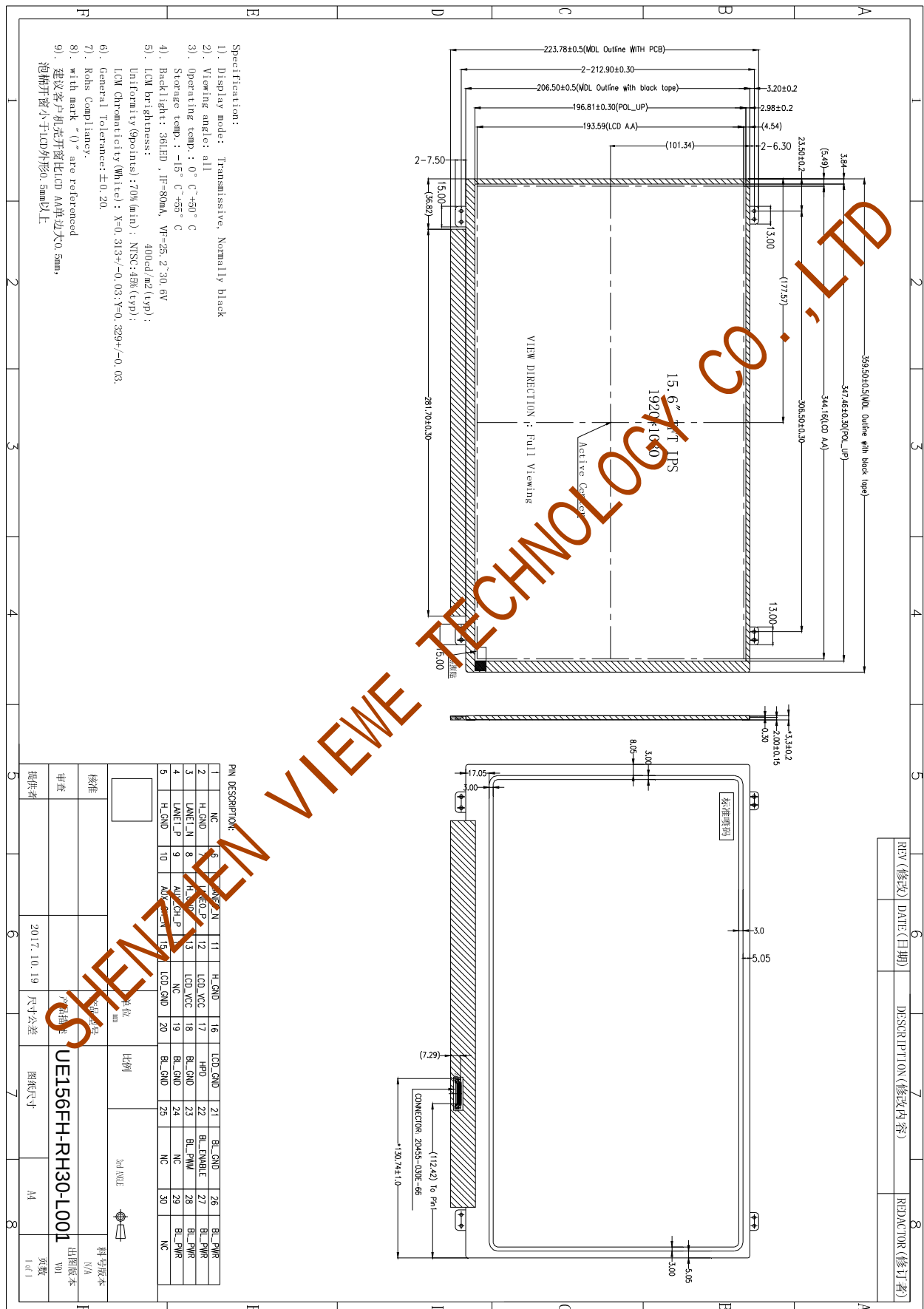
1.1 DESCRIPTION

UE156FH-RH30-L001 is a color active matrix thin film transistor (TFT) IPS liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, Driver IC ,FPC,PCBA and Backlight.

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	15.6"	inch
2	Number of Pixels	1920×RGB (3) ×1080	pixels
3	Active Area	344.16(H)x 193.59(V)	mm
4	Pixel Pitch	0.17925 (H)×0.17925(V)	mm
5	Outline Without PCB	359.5(W) ×206.5(H) ×3.3(D)	mm
6	Outline Dimension	359.5(W)×223.78(H)×3.3(D)	mm
7	Number of Colors	16.7M	-
8	Display Mode	Normally Black	-
9	Viewing Direction	ALL	-
10	Display Format	RGB vertical stripe	-
11	Luminance (cd/m ²)	400 (TYP.)	nit
12	Contrast Ratio	400(min.)	
13	Surface Treatment	Anti Glare	-
14	Interface	eDP	-
15	Backlight	White LED	-
16	Operation Temperature	0~50	℃
17	Storage Temperature	-15~55	℃
18	Polarizer Type	AG:Anti Glare(2H,3H)	-
		HC:Hard Coating	-

2. MECHANICAL SPECIFICATION



3. PIN DESCRIPTION

No.	Symbol	I/O	Function	Remark
1	NC	-	No connection	
2	H_GND	P	Ground	
3	LANE1_N	I	Complement Signal Link Lane 1	
4	LANE1_P	I	True Signal Link Lane 1	
5	H_GND	P	Ground	
6	LAN0_N	I	Complement Signal Link Lane 0	
7	LAN0_P	I	True Signal Link Lane 0	
8	H_GND	P	Ground	
9	AUX_CH_P	I	True Signal Auxiliary CH	
10	AUX_CH_N	I	Complement Signal Auxiliary CH	
11	H_GND	P	Ground	
12	LCD_VCC	P	Power Supply 3.3V(typ)	
13	LCD_VCC	P	Power Supply 3.3V(typ)	
14	NC	-	No connection	
15	LCD_GND	P	Ground	
16	LCD_GND	P	Ground	
17	HPD	O	HPD Signal output pin	
18-21	BL_GND	P	BL_GND connect to Ground	
22	BL_ENABLE	I	BL enable input	
23	BL_PWM	I	BL PWM signal input	
24	NC	-	No connection	
25	NC	-	No connection	
26-29	BL_PWR	P	BL Power Supply(12V/400mA)	
30	NC	-	No connection	

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Logic power supply	LCD_VCC	-0.3	3.3	4.2	V	

4.2 OPERATING CONDITIONS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Logic power supply	LCD_VCC	3.0	3.3	3.6	V	

4.3 CURRENT CONSUMPTION

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Logic power Current	IVCC	VCC=3.3V	400	-	-	mA	

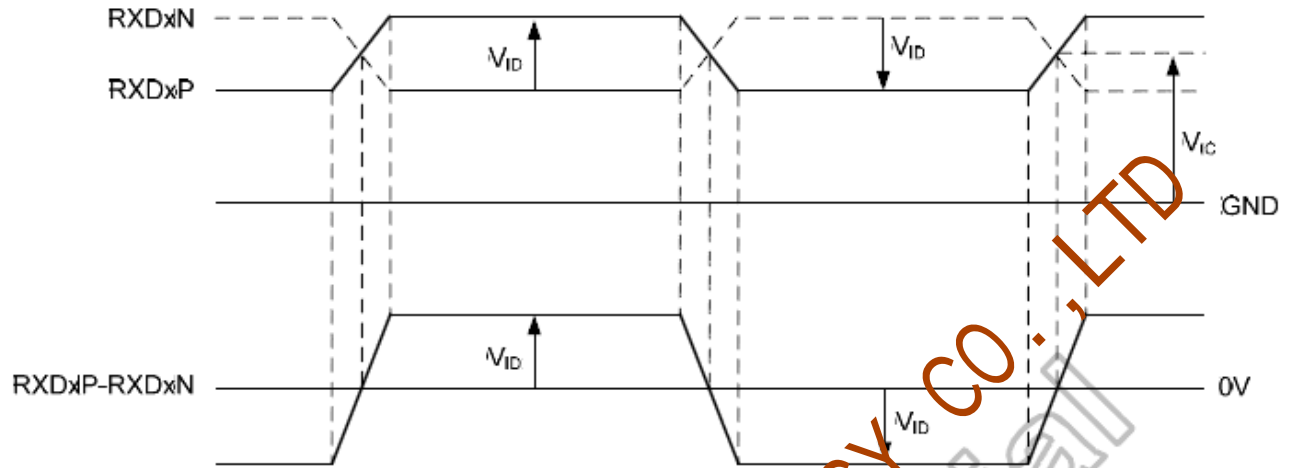
4.4 BACK LIGHT UNIT

Ta=25℃

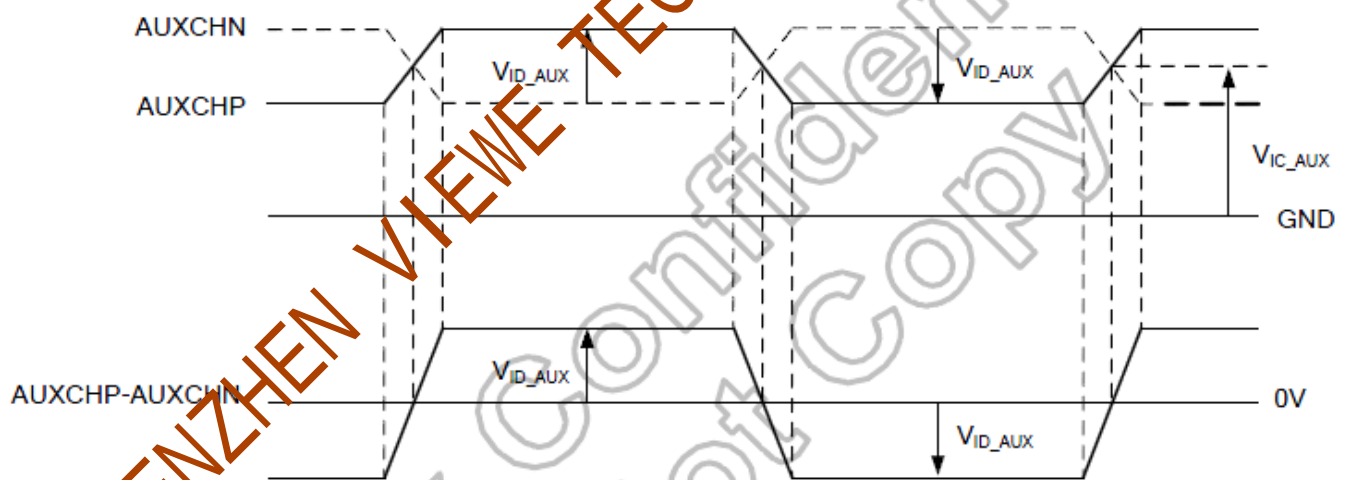
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
BL_POWER IN	BL_PWR	5	12	21	V	
BL_power Current	Ipwr	400	-	-	mA	
Luminous tolerance	IV-M	70	75	-	%	(Min/Max)×100

5. INPUT SIGNAL TIMING

5.1 SIGNAL TIMING WAVEFORMS OF INTERFACE SIGNA



Main Link Vid and Vic definition



AUX_CH Vid_aux and Vic_aux definition

5.2 DC CHARACTERISTICS

Symbol	Parameter	Condition	Spec.			Unit
			Min.	Typ.	Max.	
CMOS/TTL DC specifications						
V _{IH}	High level input voltage	-	0.7VDDIO	-	VDDIO	V
V _{IL}	Low level input voltage	-	VSSIO	-	0.3VDDIO	V
V _{OH}	High level output voltage	-	0.8VDDIO	-	VDDIO	V
V _{OL}	Low level output voltage	-	VSSIO	-	0.2VDDIO	V
I _{IN}	Input current	-	-10	-	10	μA
R _{PD}	Pull low resistance	AGMODE (Pin 13) PWMI (Pin 14) TEST (Pin 18) CABC_EN (Pin 58) COLOR_EN (Pin 59)	75	150	225	KΩ
DP DC specifications						
V _{IC}	Main link common mode voltage	-	0	-	2.0	V
V _{ID}	Main link swing voltage	2.7 Gbps	±600	-	±600	mV
		1.62 Gbps	±200	-	±600	mV
V _{IC_AUX}	AUX common mode voltage	-	0	-	2.0	V
V _{ID_AUX}	AUX swing voltage	transmitting	±0.195	-	±0.69	V
		receiving	±0.16	-	±0.68	V
mini-LVDS DC specifications						
V _{OD}	Output differential voltage	RL=100Ω TA=25°C	±170	±200	±230	mV
V _{OS}	Output offset voltage		0.6	0.8	1.0	V
I _{OD}	Output current		1.7	2	2.3	mA
PWM DC specifications						
V _{LX}	LX pin spike voltage	-	-2	-	3.6	V

5.3 PORCH TIMING

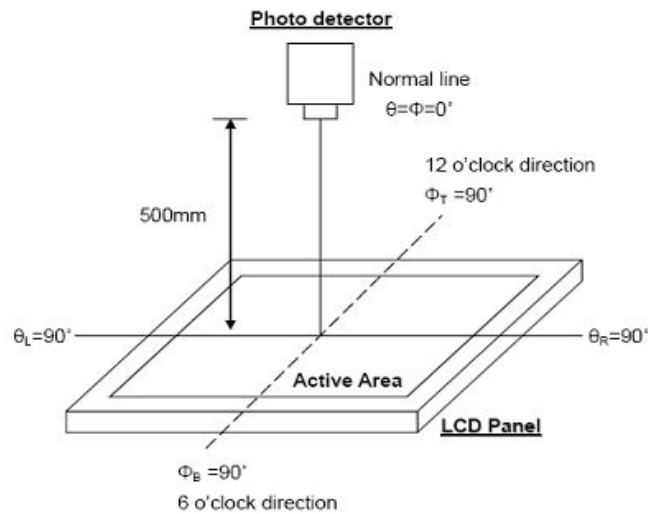
Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	1/T _C	132.5	139.77	150.0	MHz	[Note 6-1-1]
	Horizontal period	TH	2002	2080	2400	clock	
			-	14.881	-	μs	
	Horizontal period (High)	THd	-	1920	-	clock	
			-	-	-	-	
	Vertical period	TV	1103	1120	1200	line	
			-	16.667	-	ms	
Data enable signal	Vertical period (High)	TVd	-	1080	-	line	
			-	-	-	-	

6.OPTICAL CHARACTERISTICS

 $T_a = 25^{\circ}\text{C} \pm 2$

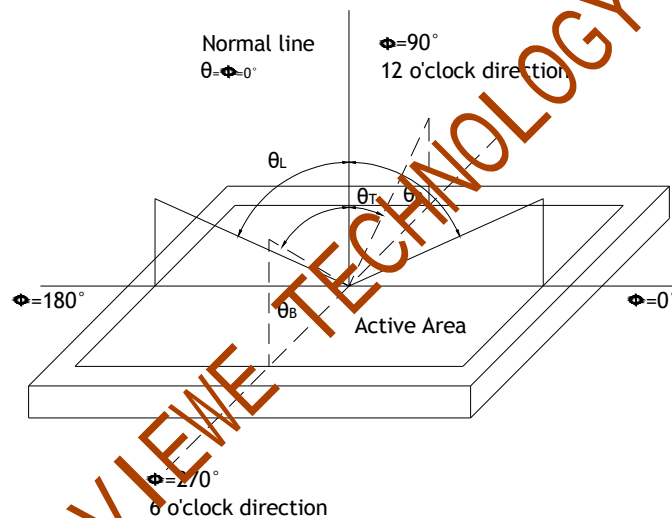
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\Theta = 0^{\circ}$	400	500	-		Note1 Note4
Luminance		YL		400	-	cd/m2		Note1 Note6 Note7
Luminance Uniformity		IV-M		70	-	-	%	
Response Time (Rising + Falling)		T _{RT}	Ta= 25°C $\Theta = 0^{\circ}$	-	25	35	ms	Note1 Note3
Viewing Angle range	Horizontal	ΘL	CR > 10	80	85	-		Note2
		ΘR		80	85	-		
	Vertical	ΘU		80	85	-		
		ΘD		80	85	-		
Color Chromaticity	White	x	$\Theta = 0^{\circ}$	TBD	TBD	TBD		Note1 Note5 Note7
		y		TBD	TBD	TBD		
	Red	x		TBD	TBD	TBD		
		y		TBD	TBD	TBD		
	Green	x		TBD	TBD	TBD		
		y		TBD	TBD	TBD		
	Blue	x		TBD	TBD	TBD		
		y		TBD	TBD	TBD		
NTSC				-	45	-	%	

Note1: Definition of optical measurement system.



Note2: Definition of viewing angle range and measurement system

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).



Note3: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

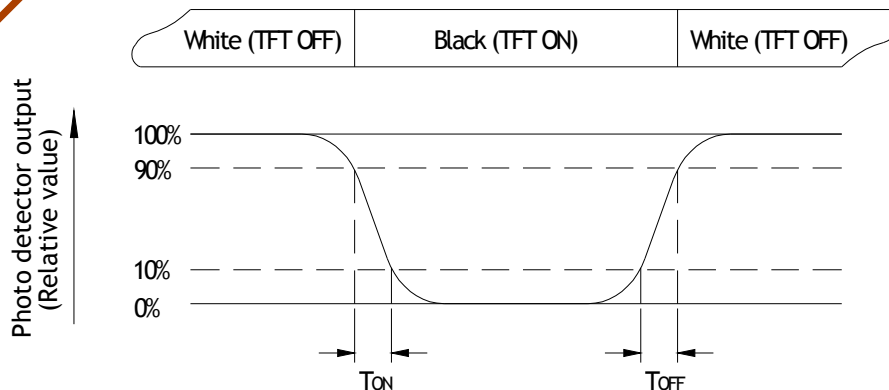


Fig. 6-3 Definition of response time

Note4: Definition of contrast ratio

Luminance measured when LCD on the Whitestate

Contrast ratio(CR)=**Luminance measured when LCD on the Blackstate**

“White state “: The state is that the LCD should drive by V_{white} .

“Black state”: The state is that the LCD should drive by V_{black} .

V_{white} : To be determined V_{black} : To be determined.

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

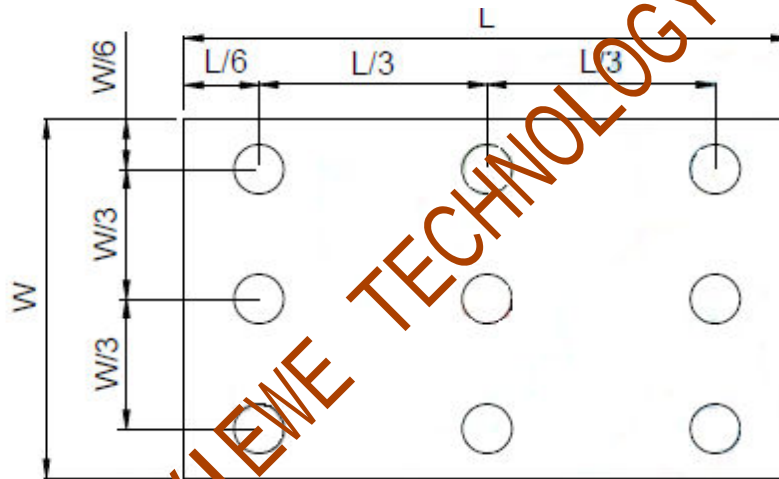
Note6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is $I_L=400mA$.

Note7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = L_{min} / L_{max}

L----Active area length, W---- Active area width



B_{max} : The measured maximum luminance of all measurement position.

B_{min} : The measured minimum luminance of all measurement position.

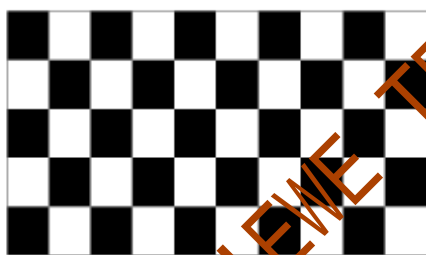
7. RELIABILITY TEST ITEMS

7.1 TEMPERATURE AND HUMIDITY

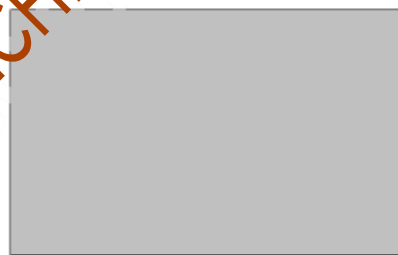
Test Item	Test Condition	Remark
High Temperature Storage	Ta=55℃; 72hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Storage	Ta=-15℃; 72hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature Operation	Ta=50℃ , 72Hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Operation	Ta=0℃; 72hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=50℃ , 90%RH , 72Hrs(no condensation)	IEC60068-2-78 : 2001 GB/T2423.3-2006
Thermal Shock	-15℃ (0.5h) ~ 55℃ (0.5h) / 10cycles	Start with cold temperature , End with high temperature , IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25℃ ; 4hrs	Note1

Note1:Condition of image sticking test :25℃±2℃

Operation with test pattern sustained for 4hrs,then change to gray pattern immediately.after5 mins,themura must be disappeared completely



(a) Test Pattern (Chess board Pattern)



(b) Gray Pattern

7.2 VIBRATION & SHOCK

Test item	Conditions	Remark
Packing Shock (non-operation)	980m/s ² ,6ms, ±x,y,z 3times for direction	IEC60068-2-27 : 1987 GB/T2423.5-1995
Packing Vibration (non-operation)	Frequency range:10 HZ~50HZ Stroke:1.0mm,sweep:10 HZ ~50HZ x,y,z 2 hours for each direction	IEC60068-2-32 : 1990 GB/T2423.8-1995

7.3 ESD

Test item	Conditions	Remark	
Electro Static Discharge Test (non-operation)	150pF , 330Ω , Contact:±4KV,Air:±8KV	1	IEC61000-4-2 : 2001 GB/T17626.2-2006
	200pF , 0Ω , ±200V contact test	2	

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins

8. GENERAL PRECAUTION

8.1 SAFETY

1. Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
2. If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
3. If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

8.2 STORAGE CONDITIONS

1. Store the panel or module in a dark place where the temperature is $23\pm5^{\circ}\text{C}$ and The humidity is below $50\pm 20\%\text{RH}$.
2. Store in anti-static electricity container.
3. Store in clean environment, free from dust, active gas, and solvent.
4. Do not place the module near organics solvents or corrosive gases.
5. Do not crush, shake, or jolt the module.

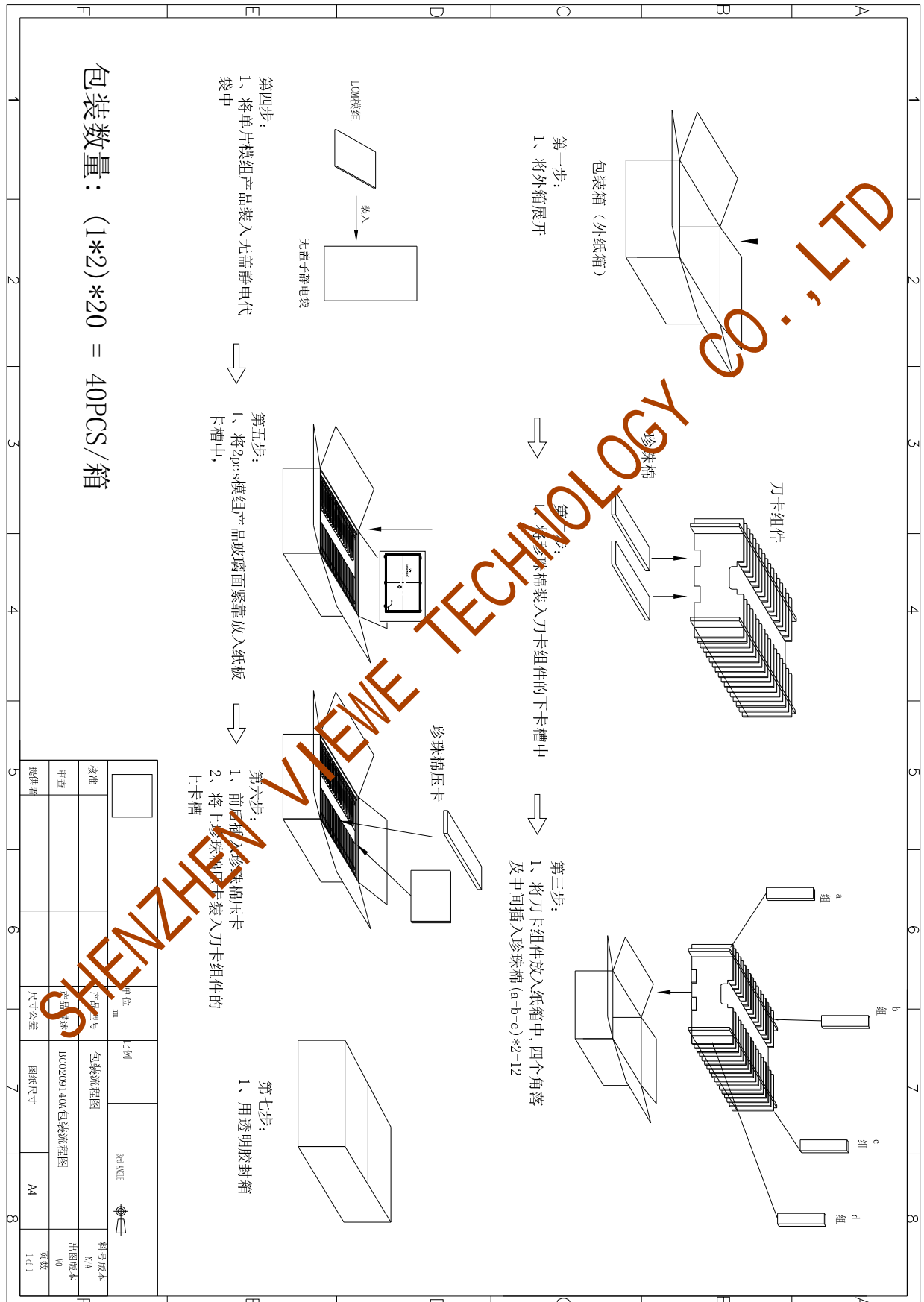
8.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.
- (6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.
- (9) When the module is assembled, it should be attached to the system firmly, Be careful not to twist and bend the module.
- (10) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining and discoloration may occur.
- (11) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

8.4 WARRANTY

- (1) The period is within twelve months since the date of shipping out under normal using and storage conditions.
- (2) Do not repair or modified the LCM. It may cause function to lose efficacy, Xian Chuang does not warrant the LCM.
- (3) All process and material comply ROHS.

9. PACKAGE DRAWING

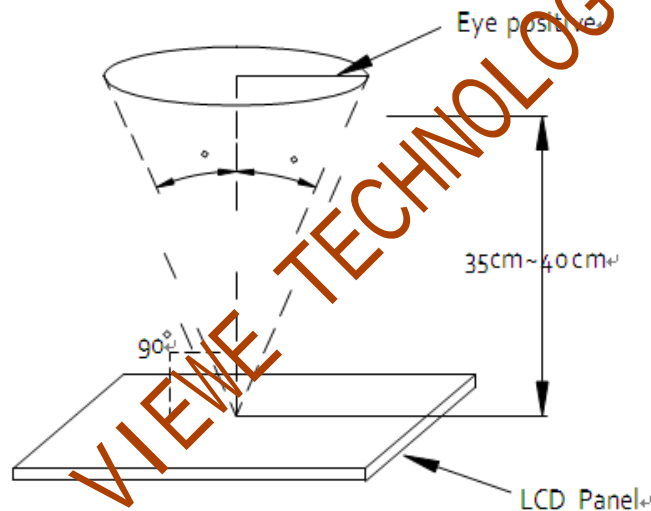


10. The foreign standards

It applies to 11.6-15.6 inches

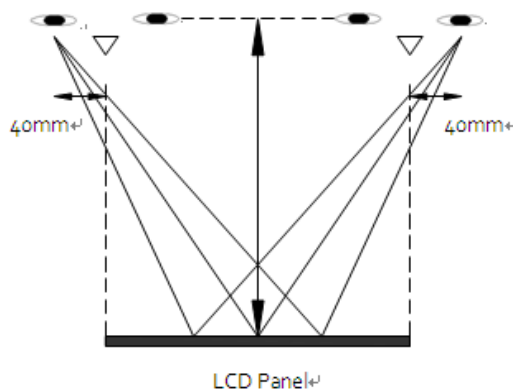
10.1. Appearance Inspection

- (1) visual range: 35cm - 40cm
- (2) visual Angle: normal visual LCD panel view (figure 1)
- (3) temperature: $23 \pm 5^{\circ}\text{C}$
- (4) ambient humidity: 60, plus or minus 5 RH
- (5) ambient illumination: under the optical test 50 Lux, test 300 Lux below, the appearance 1000 Lux above, operate 500 Lux above
- (6) the test conditions refer to the specification
- (7) Mura & leakage USES ND - 5%
- (8) The standards are not implemented according to the explicit standards



10.2. Special survey

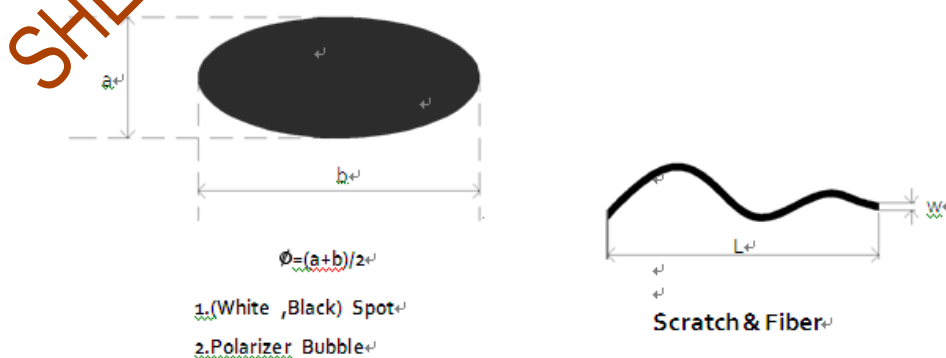
- (1) visual distance: check the distance between the adjacent points and the defect points
- (2) view change check
- (3) special inspection: image residue test



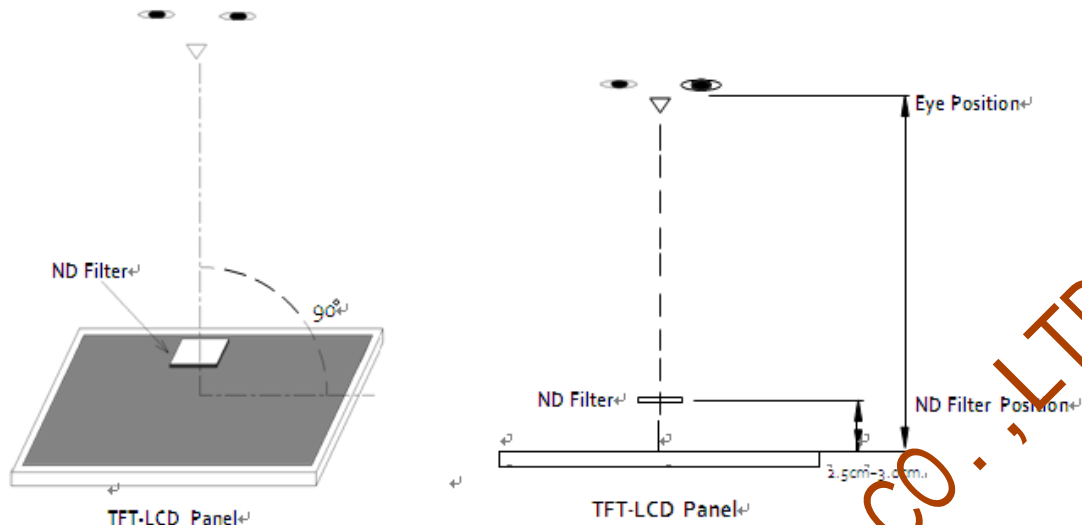
10.3. Inspection standard

Defect types			specifications			note	
Visual impairment	The scratch		$W \leq 0.05\text{mm}$		ignore	note 1	
			$0.05\text{mm} \leq w \leq 0.1\text{mm}$		$N \leq 3$		
			$L \leq 10\text{mm}$		$N=0$		
			$10\text{mm} < l, 0.1\text{mm} < w$		$N=0$		
	point	$\Phi < 0.15\text{mm}$		ignore	note 1		
		$0.15\text{mm} \leq \Phi \leq 0.35\text{mm}$		$N \leq 3$			
		$0.35\text{mm} < \Phi$		$N=0$			
	internal	Linear foreign		$0.1\text{mm} \leq W \leq 0.2\text{mm}, l \leq 5\text{mm}$		$N \leq 4$	note 1
				$0.2\text{mm} < w, 2.5\text{mm} < l$		$N=0$	
		POL convex-concave point	$\Phi < 0.15\text{mm}$		ignore	note 1	
$0.15\text{mm} \leq \Phi \leq 0.35\text{mm}$			$N \leq 2$				
$0.35\text{mm} < \Phi$			$N=0$				
Electrical defect	specifications		A ☒	B ☒	Total	note 2 note 3	
	LCD dot		$\Phi < 0.2\text{mm}$ ignore	$0.2\text{mm} < d \leq 0.5\text{mm}$	$N \leq 2$		
	POL dot		$\Phi < 0.2\text{mm}$ ignore	$0.2\text{mm} < d \leq 0.5\text{mm}$	$N \leq 2$		
	BL dot		$\Phi < 0.15\text{mm}$ ignore; $0.2\text{mm} < d \leq 0.5\text{mm}$		$N \leq 2$		
	Total points		N	$N \leq 2$	$N \leq 2$		
	Two or more adjacent points		Don't allow				
(1) 1 pixel is 3 subpixels, including R, G, and B							
(2) the distance between two points is greater than 10cm							

note 1 : W : breadth [mm], L : length [mm], N : number Φ : diameter



Note2 : Highlights: according to panel vendor specification

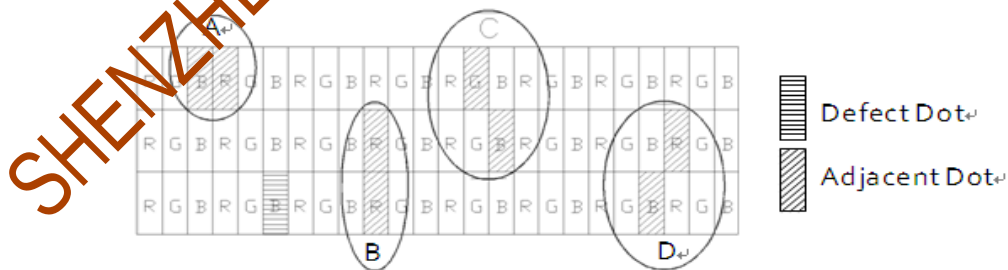


Note3:areainthemiddle,andotherBareas



Note 4: the defect points and adjacent points are as follows

Adjacent defect points, including bright and adjacent points.They're going to count the total number of points of defect



Note 5: other conditions

- (1) the lack of line mentioned above shall be handled by both parties
- (2) the missing line is not a defect or count under the black interface

10.4. Treatment measures

- (1) Don't disassemble and reassemble the module by self.
- (2) Acid, alkali, alcohol or touched directly by hand will damage the display.
- (3) Static electricity will damage the module. Please configure grounding device.
- (4) The strong vibration, shock, twist or bend will cause material damage, even module broken.
- (5) It is easy to cause image sticking while displaying the same pattern for very long time.
- (6) The response time, brightness and performance will vary from different temperature.
- (7) 12 months of the product term, Xianchuang shipment date began to count.

SHENZHEN VIEWE TECHNOLOGY CO., LTD