



深圳市思迪科科技有限公司
SHENZHEN CDTECH ELECTRONICS

Product Specification

Model Name	S070BWS117HD
Description	7.0" WSVGA 1024(RGB)x600 Dots
Date	2022/03/04
Version	1.0

Approved by/Date	Check by/Date	Prepared by/Date
ZHP 2022/03/04	HL 2022/03/04	ZWF 2022/03/04

Customer Approval	
Date	



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2. General Specifications

	Feature	Spec
Characteristics	Size	7 inch
	Resolution	1024(horizontal)*600(Vertical)
	Interface	LVDS
	Connect type	Connector
	Display Colors	16.7M
	Technology type	a-Si
	Pixel pitch (mm)	0.150*0.143
	Pixel Configuration	R.G.B.-Stripe
	Display Mode	Normally Black
	LCD Driver IC	HX8282-A11+HX8696-A01
	CTP Driver IC	-
	Viewing Direction	Full view
Mechanical	LCM (W x H x D) (mm)	165.00*100.00*5.70
	Active Area(mm)	154.21 x85.92
	With /Without TSP	Without CTP
	Weight (g)	TBD
	LED Numbers	30 LEDs

Note 1: Requirements on Environmental Protection: RoHs

Note 2: LCM weight tolerance: +/- 5%

3. Input/Output Terminals

LCD PIN-MAP

No.	Symbol	Description
1	VCOM	Common Voltage
2	VDD	Power Voltage for digital circuit
3	VDD	Power Voltage for digital circuit
4	NC	No connection
5	RESET	Global reset pin
6	STBYB	Standby mode Normally pulled high STBYB=1,normal operation STBYB=0,timing contrller,source Driver will turn off,all output are High-Z
7	GND	Ground
8	RXIN0-	-LVDS differential data input
9	RXIN0+	+LVDS differential data input
10	GND	Ground
11	RXIN1-	-LVDS differential data input
12	RXIN1+	+LVDS differential data input
13	GND	Ground
14	RXIN2-	-LVDS differential data input
15	RXIN2+	+LVDS differential data input
16	GND	Ground
17	RXCLKIN-	-LVDS differential clock input
18	RXCLKIN+	+LVDS differential clock input
19	GND	Ground
20	RXIN3-	-LVDS differential data input
21	RXIN3+	+LVDS differential data input
22	GND	Ground
23	NC	No connection
24	NC	No connection
25	GND	Ground
26	NC	No connection
27	DIMO	Backlight CABC controller signal output
28	SELB	6bit/8bit mode select (Note 1)
29	AVDD	Power for Analog Circuit
30	GND	Ground
31	LED-	LED Cathode

32	LED-	LED Cathode	
33	L/R	Horizontal inversion	(Note 2)
34	U/D	Vertical inversion	(Note 2)
35	VGL	Gate oFF Voltage	Power supply
36	CABCEN1	CABC H/W enable	(Note 3)
37	CABCEN0	CABC H/W enable	(Note 3)
38	VGH	Gate ON Voltage	
39	LED+	LED Anode	
40	LED+	LED Anode	

Note 1: if LVDS input data is 6bit,selb must be set to high;

if LVDS input data is 8bit,selb must be set to low;

Note 2: when L/R=0 set right to left scan direction

when L/R=1 set left to right scan direction

when U/D=0 set top to bottom scan direction

when U/D=1 set bottom to top scan direction

Note 3:

CABC H/W enable pin. Normally pull low.

When CABC_EN="00", CABC off. (Default mode)

When CABC_EN="01", user interface Image.

When CABC_EN="10", still Picture.

When CABC_EN="11", moving Image.



4. Absolute Maximum Rating

Item	Symbol	MIN	Typ	MAX	Unit	Remark
Supply Voltage	VDD	-0.3	-	5	V	-
Operating Temperature	TOPR	-20	-	70	°C	-
Storage Temperature	TSTG	-30	-	80	°C	-

5. Electrical Characteristics

5.1 Driving TFT LCD Panel

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power supply for LCD	VDD	3.0	3.3	3.6	V	
	AVDD	9.0	9.8	10.5	V	
	VGH	16.0	18.0	20	V	
	VGL	-7.5	-6.0	-5.0	V	
	VCOM	2.9	3.25	3.5	V	

5.3 LED Driving Conditions

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	200	-	mA	
Forward Voltage	V_F	8.1	-	10.2	V	
Backlight Power consumption	W_{BL}	1.62	-	2.04	W	
LED Lifetime		-	50000	-	Hrs	

Note 1: Each LED: $I_F = 20 \text{ mA}$, $V_F = 2.7\text{-}3.4\text{V}$.

Note 2: Optical performance should be evaluated at $T_a = 25^\circ\text{C}$ only.

Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life Time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

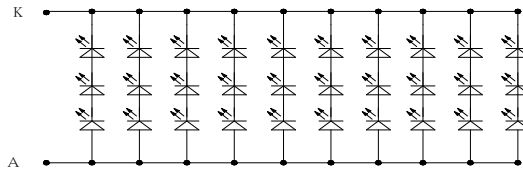
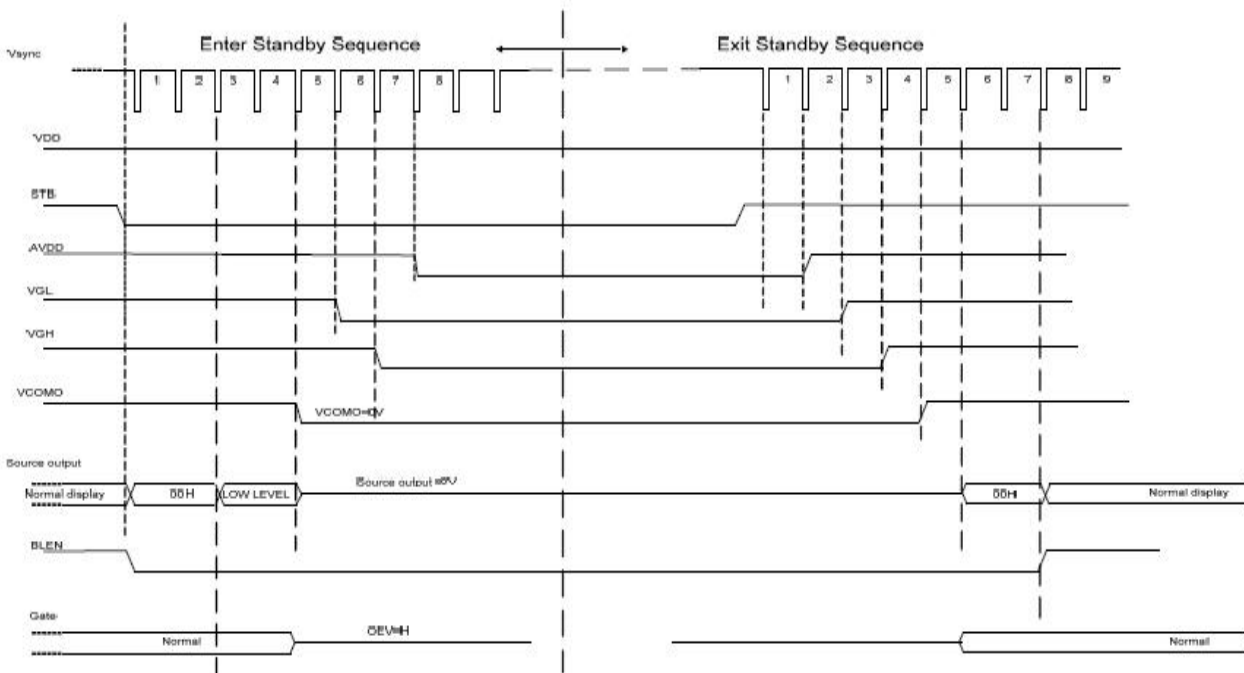
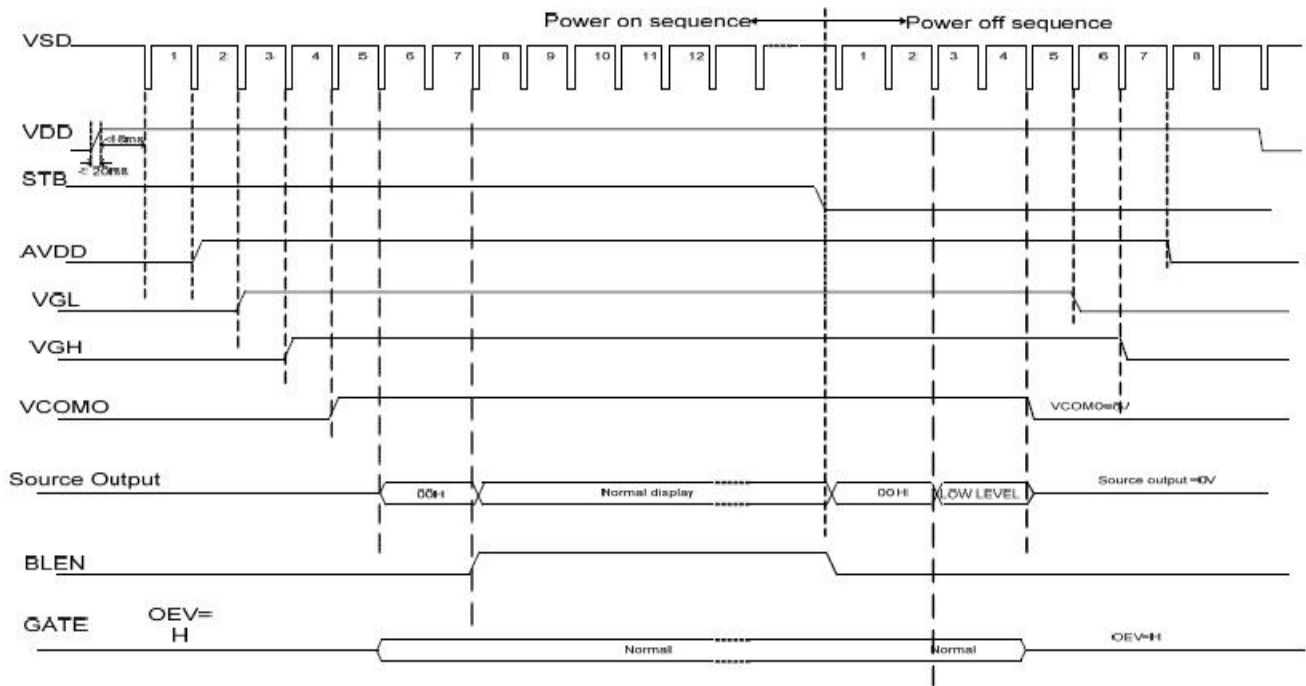


Figure: LED connection of backlight(Constant Current)

6. Interface Timing

6.1 Power sequence

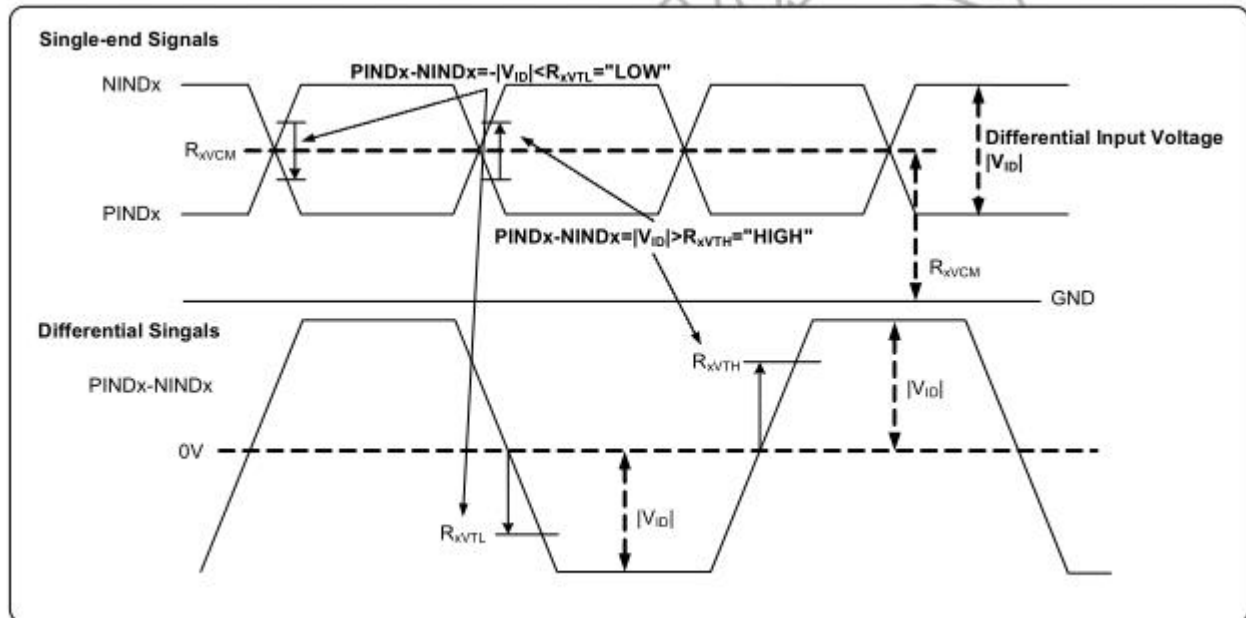


6.2 Timing Characteristics

LVDS mode DC electrical characteristics

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Differential input high Threshold voltage	R_{XVTH}	-	-	+0.1	V	$R_{XVCM}=1.2V$
Differential input low threshold voltage	R_{XVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{XVIN}	0	-	$VDD-1.2+ V_{ID} /2$	V	-
Differential input common Mode voltage	R_{XVCM}	$ V_{ID} /2$	-	$VDD-1.2$	V	-
Differential input voltage	$ V_{ID} $	0.2	-	0.6	V	-
Differential input leakage Current	$R_{V_{XIIz}}$	-10	-	+10	μA	-
LVDS Digital Operating Current	I_{ddlvds}	-	15	30	mA	$F_{clk}=65MHz, VDD=3.3V$
LVDS Digital Stand-by Current	I_{stlvds}	-	10	50	μA	Clock & all Functions are stopped

Table 9.3: LVDS mode DC electrical characteristics



LVDS mode AC electrical characteristics

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{XFCLK}	20	-	71	MHz	-
Input data skew margin	T_{RSKM}	500	-	-	pS	$ V_{ID} =400mV$ $R_{XVCM}=1.2V$ $R_{XFCLK}=71MHz$
Clock high time	T_{LVCH}	-	$4/(7 * R_{XFCLK})$	-	ns	-
Clock low time	T_{LVCL}	-	$3/(7 * R_{XFCLK})$	-	ns	-
PLL wake-up time	T_{emPLL}	-	-	150	μs	-

Table 10.2: LVDS mode AC electrical characteristics

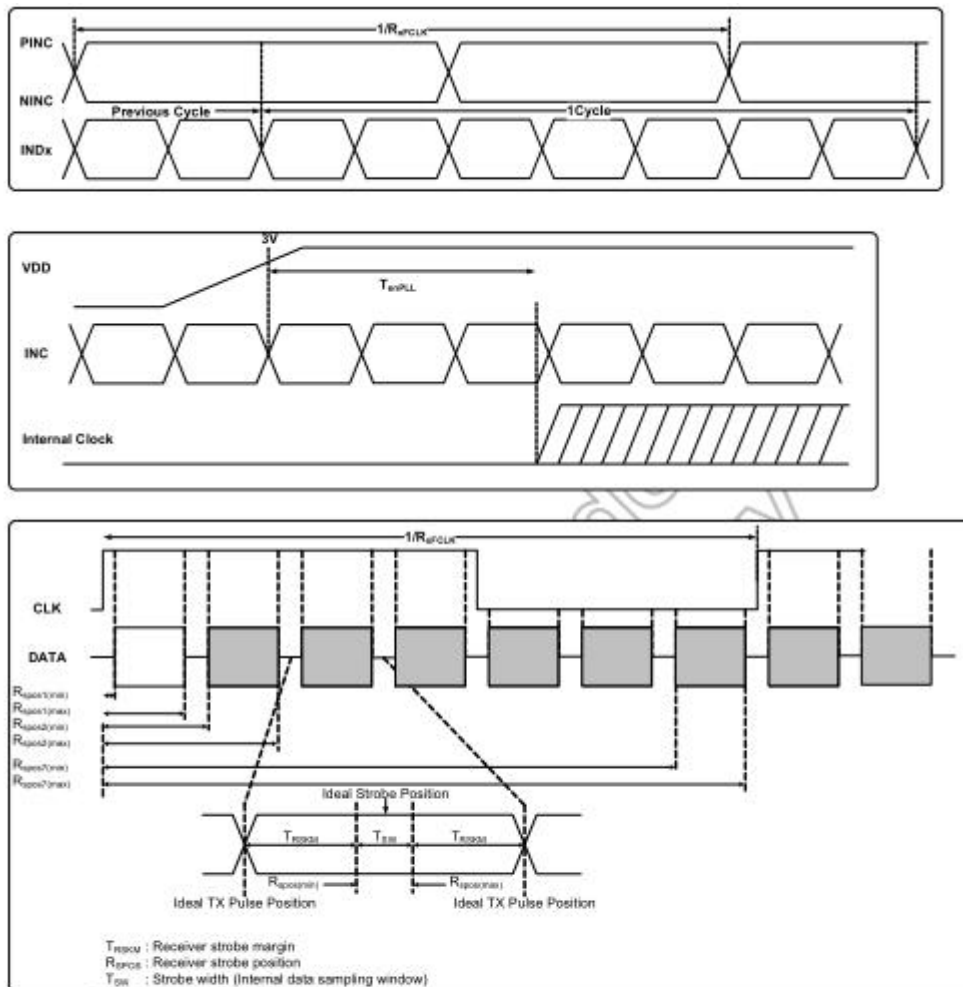


Figure 10.1: LVDS figure

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Modulation Frequency	SSC_{MF}	23	-	93	KHz	-
Modulation Rate	SSC_{MR}	-	-	± 3	%	LVDS clock =71MHz center spread

Table 10.3: SSC table

LVDS mode data input format

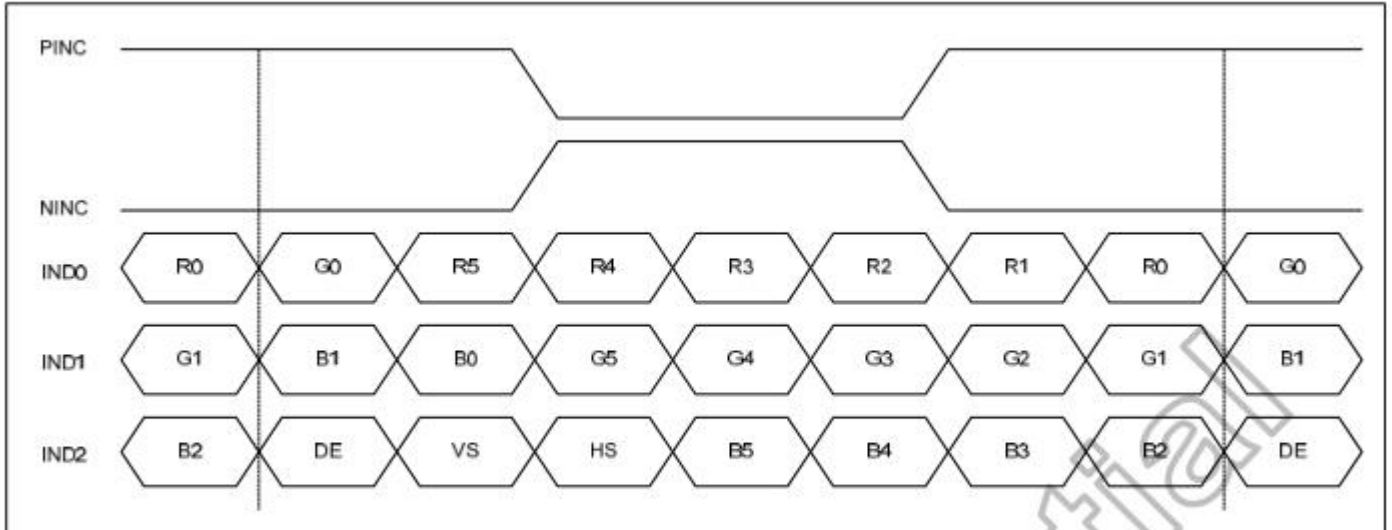


Figure 10.4: 6-bit LVDS input

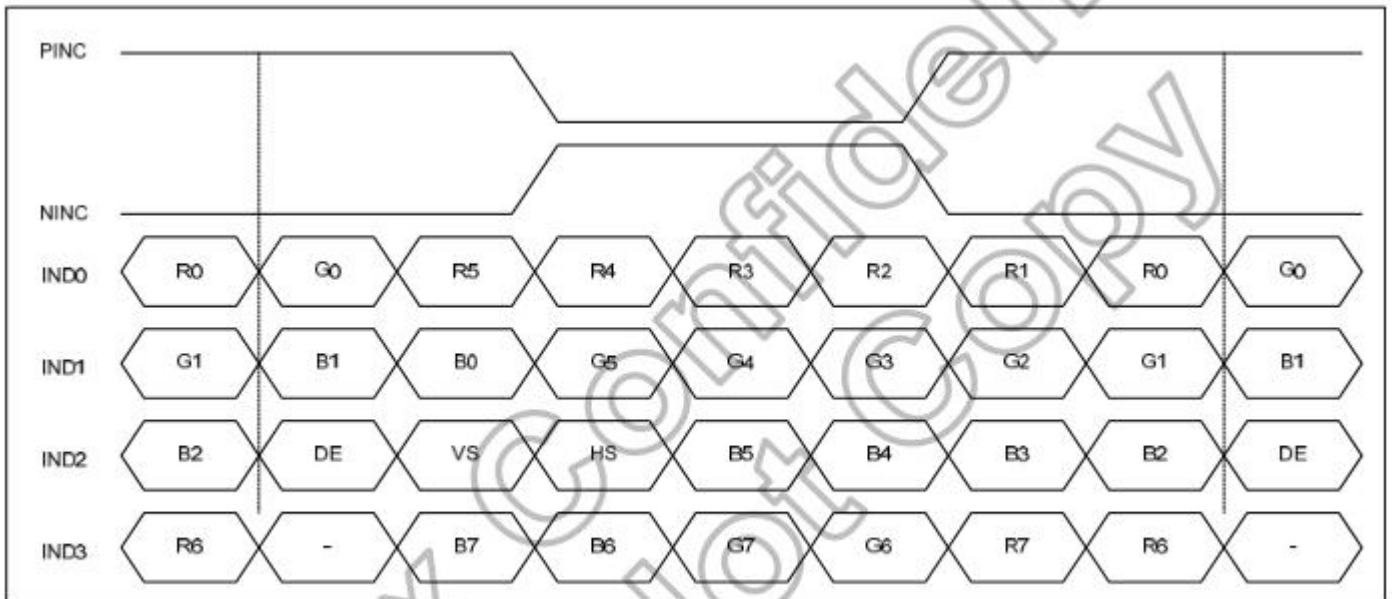


Figure 10.5: 8-bit LVDS Input

Input clock and data timing diagram

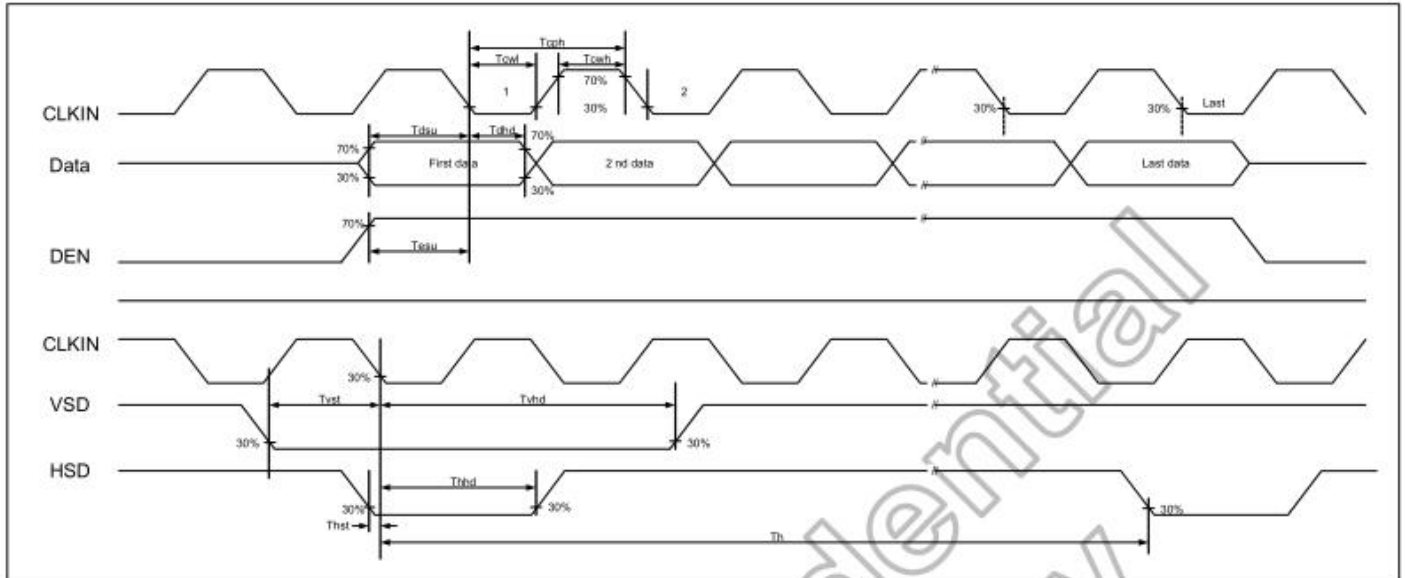


Figure 11.1: Input clock and data timing diagram

Output timing table

Parallel 24-bit RGB mode

Parameter	Symbol	Spec.			Unit	Conditions
		Min.	Typ.	Max.		
CLKIN Frequency	Fclk	-	65	71	MHz	VDD=3.0V~3.6V
CLKIN Cycle Time	Tclk	14.1	15.4	-	ns	-
CLKIN Pulse Duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso		64		CLKIN	-
Time from HSD to LD	Thld		64		CLKIN	-
Time from HSD to STV	Thstv		2		CLKIN	-
Time from HSD to CKV	Thckv		20		CLKIN	-
Time from HSD to OEV	Thoev		4		CLKIN	-
LD Pulse Width	Twld		10		CLKIN	-
CKV Pulse Width	Twckv		66		CLKIN	-
OEV Pulse Width	Twoev		74		CLKIN	-

Table 11.1: Parallel 24-bit RGB mode

Source output timing diagram (Cascade)

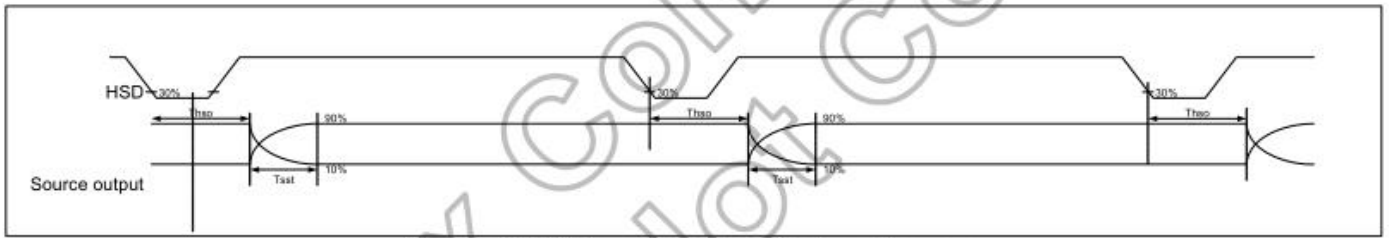


Figure 11.2: Source output timing diagram

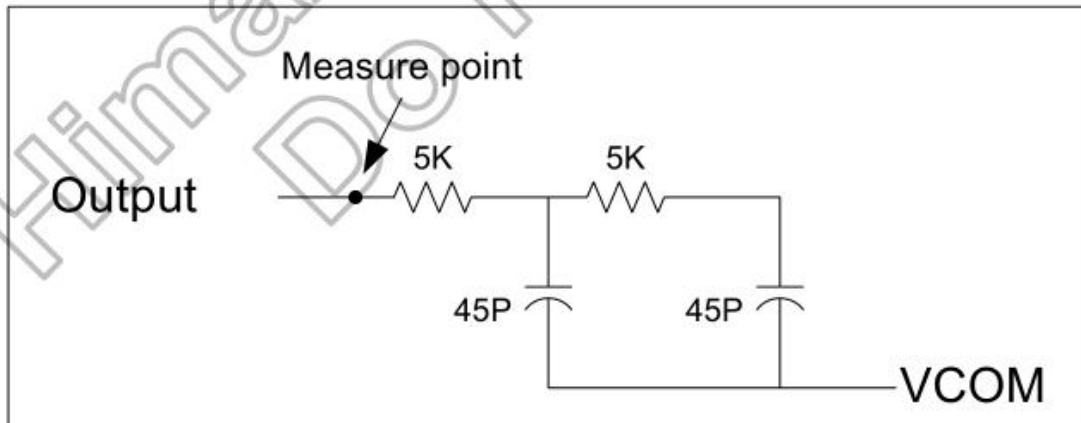


Figure 11.3: Output load condition

7. Optical Characteristics

Items	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	Note
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Response time		Tr+Tf	-	30	40	ms	FIG.1	Note4	
Contrast Ratio		CR	-	500	800	-	FIG.2	Note1	
Surface luminance		LV	$\theta=0^\circ$	450	500	-	cd/m ²	FIG.2 Note2	
Luminance uniformity		Yu	$\theta=0^\circ$	70	75	-	%	FIG.2 Note3	
NTSC		-	$\theta=0^\circ$	-	50	-	%	FIG.2 Note5	
Viewing angle		θ_T	Center CR \geq 10	-	85	-	deg	FIG.3	Note6
		θ_B		-	85	-	deg	FIG.3	
		θ_L		-	85	-	deg	FIG.3	
		θ_R		-	85	-	deg	FIG.3	
Chromaticity	Red	R _X	$\theta=0^\circ$ $\phi=0^\circ$ Ta=25°	0.549	0.599	0.649	-	FIG.2 CIE1931	Note5
		R _Y		0.255	0.338	0.355	-		
	Green	G _X		0.249	0.299	0.349	-		
		G _Y		0.500	0.550	0.600	-		
	Blue	B _X		0.089	0.139	0.189	-		
		B _Y		0.081	0.131	0.181	-		
	White	W _X		0.258	0.308	0.358	-		
		W _Y		0.286	0.336	0.386	-		

Note1. Definition of contrast ratio

Contrast ratio(Cr) is defined mathematically by the following formula. For more information see FIG.2.

$$\text{Contrast ratio} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

For contrast ratio, Surface Luminance, Luminance uniformity and CIE,the testing data is base on TOPCON's BM-5 or BM-7 photo detector or compatible.

Note2. Definition of surface luminance.

Surface luminance is the luminance with all pixels displaying white. For more information see FIG.2.

Lv = Average Surface Luminance with all white pixels(P1,P2,P3,,Pn)

Note3. Definition of luminance uniformity

The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1 through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance.For more information see FIG.2.

$$YU = \frac{\text{Minimum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}{\text{Maximum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}$$

Note4. Definition of response time

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

For additional information see FIG1.

Note5. Definition of color chromaticity (CIE1931)

CIE (x,y) chromaticity, The x,y value is determined by screen active area center position P5. For more information see FIG.2.

Note6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 10. Angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG.3.

For viewing angle and response time testing, the testing data is base on Autronic-Melchers's ConoScope or DMS series Instruments or compatible.

FIG.1. The definition of response Time

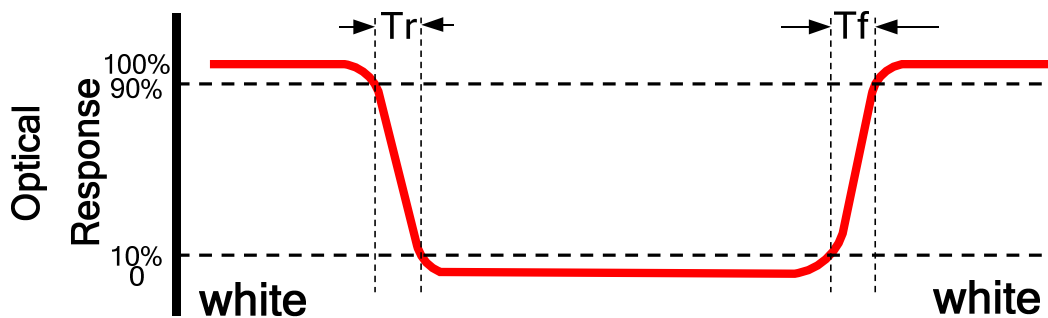


FIG.2. Measuring method for contrast ratio, surface luminance, luminance uniformity, CIE (x,y) chromaticity

Size : $S \leq 5''$ (see Figure a) A : 5 mm B : 5 mm
H, V : Active area

Light spot size $\varnothing = 5\text{mm}$ (BM-5) or $\varnothing = 7.7\text{mm}$ (BM-7) 50cm distance or compatible distance from the LCD surface to detector lens.

test spot position : see Figure a.

measurement instrument : TOPCON's luminance meter BM-5 or BM-7 or compatible (see Figure c).

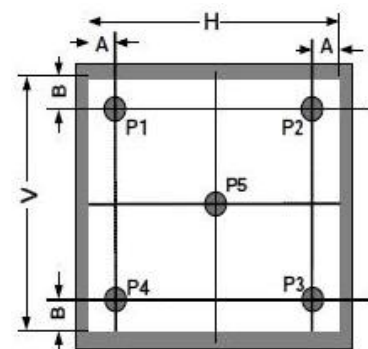


Figure a

Size : $5'' < S \leq 12.3''$ (see Figure b) H, V : Active area

Light spot size $\varnothing = 5\text{mm}$ (BM-5) or $\varnothing = 7.7\text{mm}$ (BM-7) 50cm distance or compatible distance from the LCD surface to detector lens.

test spot position : see Figure b.

measurement instrument : TOPCON's luminance meter BM-5 or BM-7 or compatible (see Figure c).

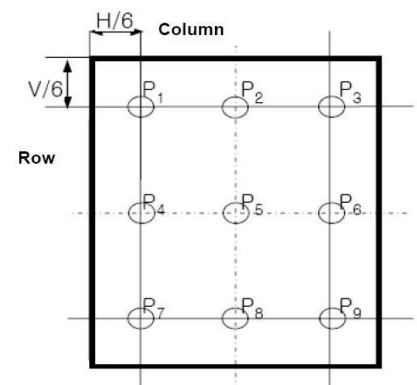


Figure b

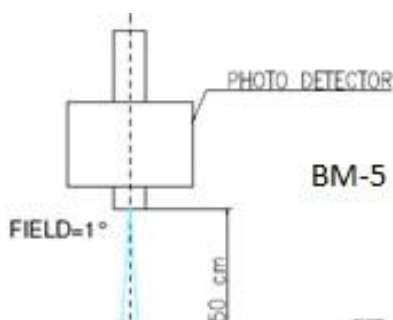
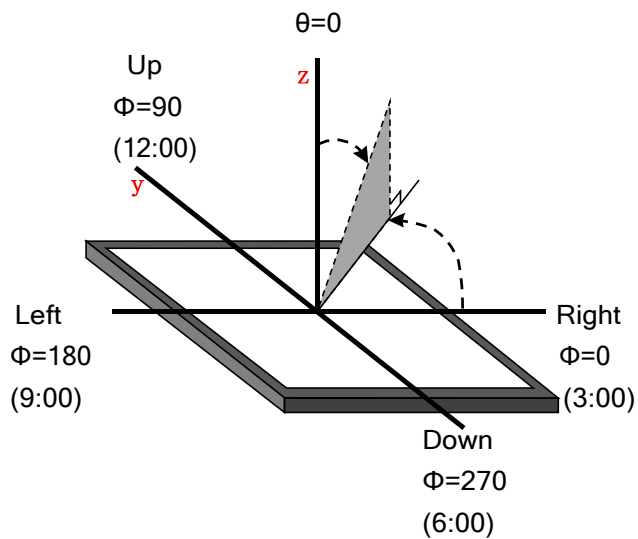


Figure c

FIG.3.The definition of viewing angle



8. Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +70°C, 96hrs	IEC60068-2-1:2007 GB2423. 2-2008
2	Low Temperature Operation	Ta= -20°C, 96hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta= +80°C, 96hrs	IEC60068-2-1:2007 GB2423. 2-2008
4	Low Temperature Storage	Ta= -30°C, 96hrs	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature & Humidity Operation	Ta= +60°C, 90% RH max, 96 hours	IIEC60068-2-78:2001 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30°C 30 min ~ +80°C 30 min Change time: 5min, 20 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14:1984, GB2423.22-2002
7	ESD	C=150pF, R=330 Ω, 5 points/panel , Air:±8KV, 5 times Contact: ±4KV, 5 times (Environment: 15°C ~ 35°C, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.5mm , Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (6 hours for total)	IEC60068-2-6:1982 GB/T2423.10-1995
9	Mechanical Shock (Non-operation)	Half Sine Wave 60G ,6ms,±X,±Y,±Z 3times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height: 60 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8-1995

Notes:

1. The test result shall be evaluated after the sample has been left at room temperature and humidity for 2 hours without load. No condensation shall be accepted. The sample will not be accepted if appear these defects:

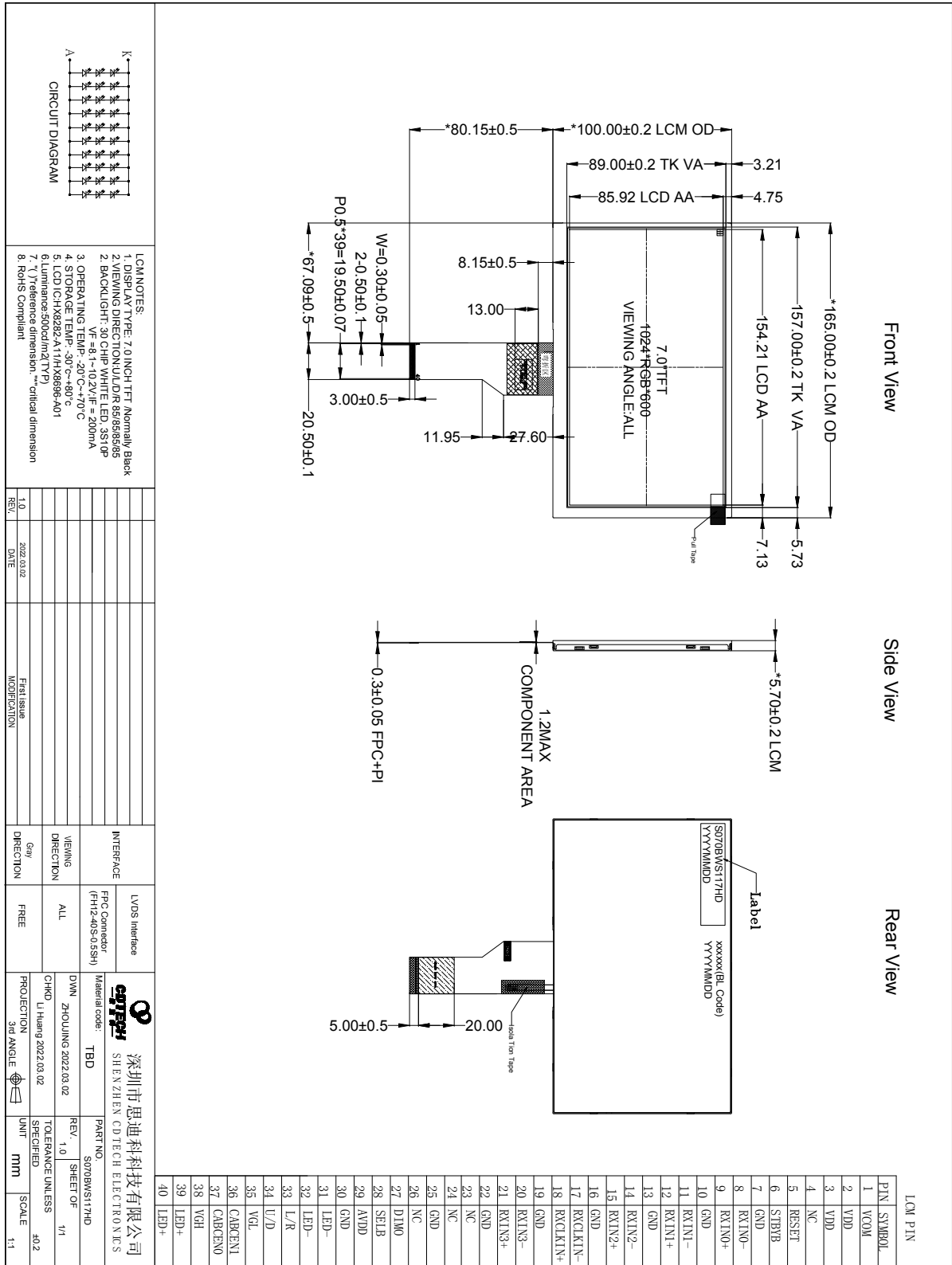


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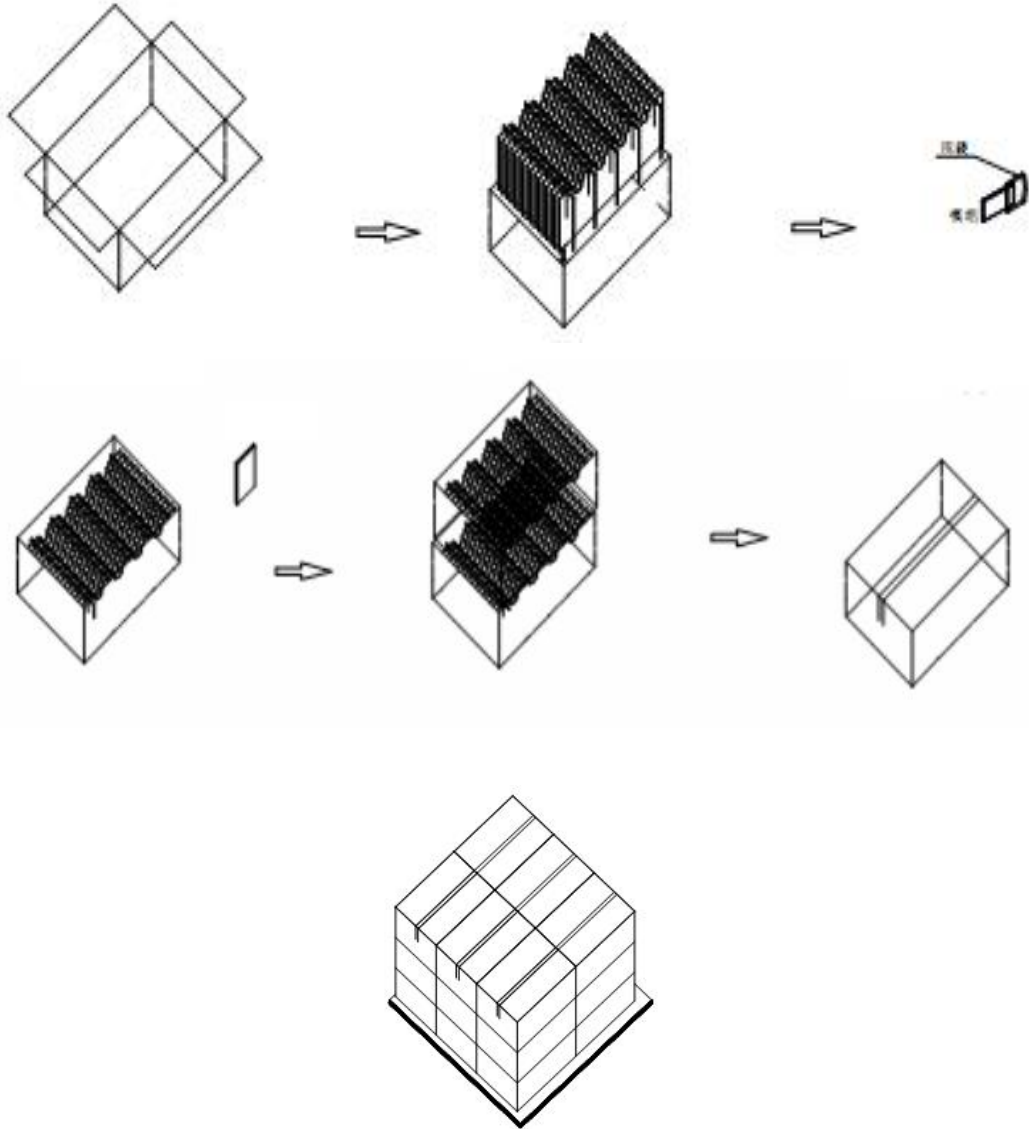
- 1).Air bubble in the LCD;
- 2).Seal leak
- 3).Non-display
- 4).missing segments
- 5).Glass crack
- 6).CR reduction >40%
- 7).IDD increase >100%
- 8).Brightness reduction >50%
- 9).Color coordinate tolerance >0.05
- 2.≤7.0 inch: The size of sample is 5pcs;
>7.0 inch: The size of sample is 2pcs;
3. One test sample must complete each test item;
- 4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.
- 5.In the test of High Temperature Operation and High Temperature & Humidity Operation ,the operation temperature is the surface temperature of module.

9. Mechanical Drawing



10. Packing

Packing Method



11. TFT-LCD Module Inspection Criteria

11.1 Scope

The incoming inspection standards shall be applied to TFT –LCD Modules (hereinafter Called "Modules") that supplied by CDTech Technology LTD.

11.2 Incoming Inspection

The customer shall inspect the modules within twenty calendar days of the delivery date (the "inspection period") at its own cost. The result of the inspection (acceptance or rejection) shall be recorded in writing, and a copy of this writing will be promptly sent to The seller, If the results of the inspecting from buyer does not send to the seller within twenty Calendar days of the delivery date. The modules shall be regards as acceptance. Should the customer fail to notify the seller within the inspection period, the buyers Right to reject the modules shall be lapsed and the modules shall be deemed to have Been accepted by the buyer

11.3 Inspection Sampling

- 3.1. Lot size: Quantity per shipment lot per model
 - 3.2. Sampling type: Normal inspection, Single sampling
 - 3.3. Inspection level: II
 - 3.4. Sampling table: MIL-STD-105E
 - 3.5. Acceptable quality level (AQL)
- Major defect: AQL=0.65 Minor defect: AQL=1.00

11.4 Inspection Conditions

4.1 Ambient conditions:

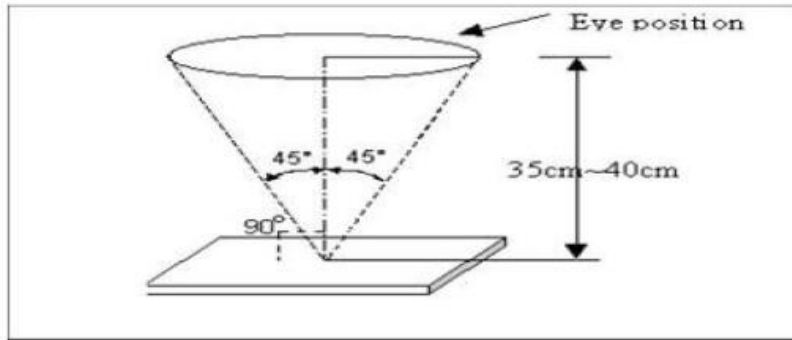
- a. Temperature: Room temperature $25\pm 5^{\circ}\text{C}$
- b. Humidity: $(60\pm 10)\% \text{RH}$
- c. Illumination: Single fluorescent lamp non-directive (300 to 700 Lux)

4.2 Viewing distance

The distance between the LCD and the inspector's eyes shall be at least 35 ± 5 cm.

4.3 Viewing Angle

U/D: $45^{\circ}/45^{\circ}$, L/R: $45^{\circ}/45^{\circ}$



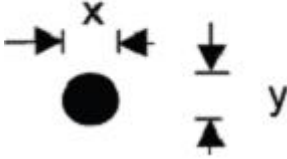
11.5 Inspection Criteria

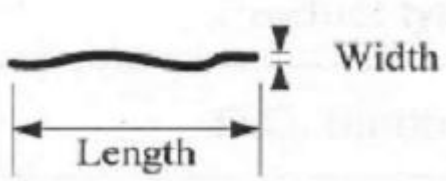

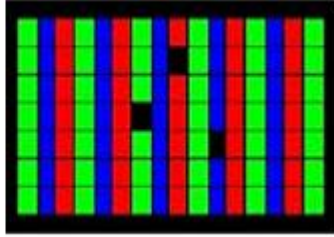
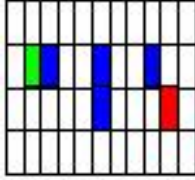
Defects are classified as major defects and minor defects according to the degree of Defectiveness defined herein.

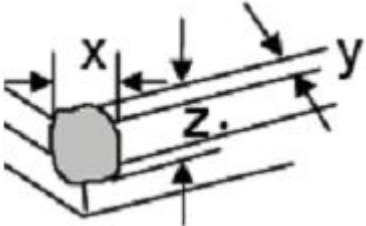
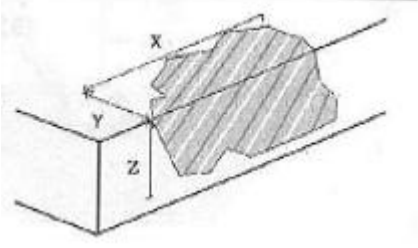
11.5.1 Major defect

Item No	Items to be inspected	Inspection Standard
5.1.1	All functional defects	1) No display 2) Display abnormally 3) Short circuit 4) line defect
5.1.2	Missing	Missing function component
5.1.3	Crack	Glass Crack

11.5.2 Minor defect

Item No	Items to be inspected	Inspection standard	
5.2.1	Spot Defect Including Black spot White spot Pinhole Foreign particle Polarizer dirt	For dark/white spot is defined $\phi = (x+y) / 2$ 	
		Size ϕ (mm)	Acceptable Quantity
		$\phi \leq 0.2$	Ignore
		$0.2 < \phi \leq 0.35$	3
		$0.35 < \phi$	Not allowed

5.2.2	Line Defect Including Black line White line Scratch	Define: 	
		Width(mm) Length(mm)	Acceptable Quantity
		$W \leq 0.05$	Ignore
		$0.05 < W \leq 0.1$ $L \leq 2.5$	3
		$0.1 < W$, or $L > 2.5$	Not allowed
5.2.3	Polarizer Dent/Bubble	Size ϕ (mm)	Acceptable Quantity
		$\phi \leq 0.2$	Ignore
		$0.2 < \phi \leq 0.35$	3
		$0.35 < \phi$	Not allowed
		Total QTY	3
5.2.4	Electrical Dot Defect	Bright and Black dot define:  and 	
		 Two Adjacent Dot	
		Inspection pattern: Full white、 Full black、 Red、 green and blue screens	
		Item	Acceptable Quantity
		Black dot defect	3
		Bright dot defect	2
Total Dot	3		

5.2.5	Glass defect	 <p>1. Corner Fragment:</p>	
		Size(mm)	Acceptable Quantity
		X≤3mm Y≤1mm Z≤T	Ignore T: Glass thickness X: Length Y: Width Z: thickness
		 <p>2. Side Fragment:</p>	
		Size(mm)	Acceptable Quantity
		X≤5.0mm Y ≤1mm Z≤T	T: Glass thickness X: Length Y: Width Z: thickness

- Note:
- 1). Dot defect is defined as the defective area of the dot area is larger than 50% of the dot area.
 - 2). The distance between two bright dot defects (red, green, blue, and white) should be larger than 15mm.
 - 3). The distance between black dot defects or black and bright dot defects should be more than 5mm apart.
 - 4). Polarizer bubble is defined as the bubble appears on active display area. The defect of polarizer bubble shall be ignored if the polarizer bubble appears on the outside of active display area.

11.6 Mechanics specification

As for the outside dimension, weight of the modules, please refer to product specification
For more details

12. Precautions for Use of LCD modules

12.1 Handling Precautions

12.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

12.1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

12.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

12.1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

12.1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketene

12.1.6. Do not attempt to disassemble the LCD Module.

12.1.7. If the logic circuit power is off, do not apply the input signals.

12.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

12.1.8.1. Be sure to ground the body when handling the LCD Modules.

12.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

12.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

12.1.8.4. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

12.2 Storage Precautions

12.2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

12.2.2. The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0°C ~ 40°C Relatively humidity: ≤80%

12.2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.



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12.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.