PRODUCT SPECIFICATION

CDTECH Model: **S070BWS121HD-DC118**

CUSTOMER Model: -

Description: **7.0” TFT-LCD Module with CTP**

Version: **1.0**

CDTECH	PREPARED BY	CHECKED BY	APPROVED BY
SIGNATURE			
DATE	2022.6.14	2022.6.14	2022.6.14

	SIGNATURE	DATE
CUSTOMER APPROVAL		

Record of Revisions

Version	Revise Date	Description	Page
1.0	2022-06-14	First Release	-

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1. General Specifications

1.1 LCM General Information

Item	Specification	Unit
LCD Size	7.0	inch
Number of Pixels	1024(H) RGB x 600(V)	pixels
Display Mode	Normally Black	-
Viewing Direction	Free	o' clock
Interface	LVDS	-
Display Colors	16.7M	colors
Outline Dimension	185.80(H) x 113.80(V) x 7.87(D)	mm
Active Area	154.21(H) x 85.92 (V)	mm
Pixel Pitch	0.1506(H) x 0.1432(V)	mm
Driver IC	EK79001HN+EK73215BCGA	-
Operation Temperature	-20~70	℃
Storage Temperature	-30~80	℃

1.2 Touch Panel Information

Item	Specification
Touch Structure	G+G
Bonding Type with LCM	Perimeter Bonding
Driver IC	ILI2511
Interface	USB
Touch Count Max	2 Points
Surface treatment	-
Surface hardness	6H
I2C slave address	0×82
Origin of coordinate	Top Left Corner

Note1:Requirements on environmental protection RoHS compliant.

2. Absolute Maximum Ratings

Item	Symbol	MIN.	MAX.	Unit	Note
Analog Supply voltage	VDD	-0.3	5.0	V	Note 1

Note 1:Permanent damage may occur to the LCD module if beyond this specification.
Functional operation should be restricted to the conditions described under normal operating conditions.

3. Elecrical Characteristics

3.1 Recommended Operating Condition for TFT LCD

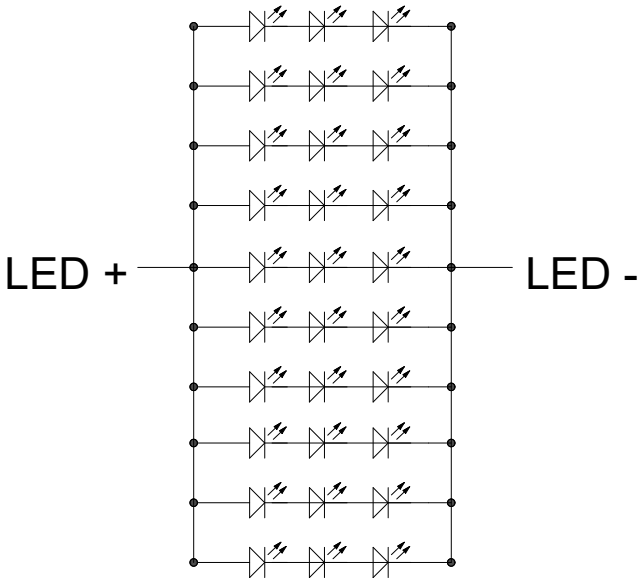
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Analog Supply voltage	VDD	3.0	3.3	3.6	V	
Analog supply current	I_{VDD}	-	TBD	-	mA	VDD=3.3V
	AVDD	9.0	9.8	10.5	V	
	VGH	16.0	18.0	20	V	
	VGL	-7.5	-6.0	-5.0	V	
	VCOM	2.9	3.25	3.5	V	
Logic input voltage	VIH	0.7*IOVCC	-	IOVCC	V	
	VIL	GND	-	0.3*IOVCC	V	

3.2 Recommended Driving Condition for Backlight

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Driving Current	I_F	-	200	-	mA	
Driving Voltage	V_F	8.1	-	10.	V	
Power consumption	W_{BL}	1.68	-	2.16	W	
LED Life-Time	N/A	30,000	-	-	Hours	Ta=25℃ Note 1

Note 1:LED lifetime is defined as the module brightness decay 50% of original brightness at Ta=25 degree, typical current.

Note 2:LED circuit :



3.3 Touch Panel

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply voltage	VCC	-	5.0	-	V	
Analog supply current	I_{VCC}	-	TBD	-	mA	VCC=5.0V
Input high-level voltage	VIH	0.7*VCC	-	VCC	V	
Input low -level voltage	VIL	GND	-	0.3*VCC	V	

4. Interface Pin Assignment

4.1 LCM Pin Assignment

Recommended connector：FH12-40S-0.5SH manufactured by HIROSE

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 controller,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(HSD)	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	NC	No connection	
37	NC	No connection	
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

4.2 Touch FPC Pin Assignment

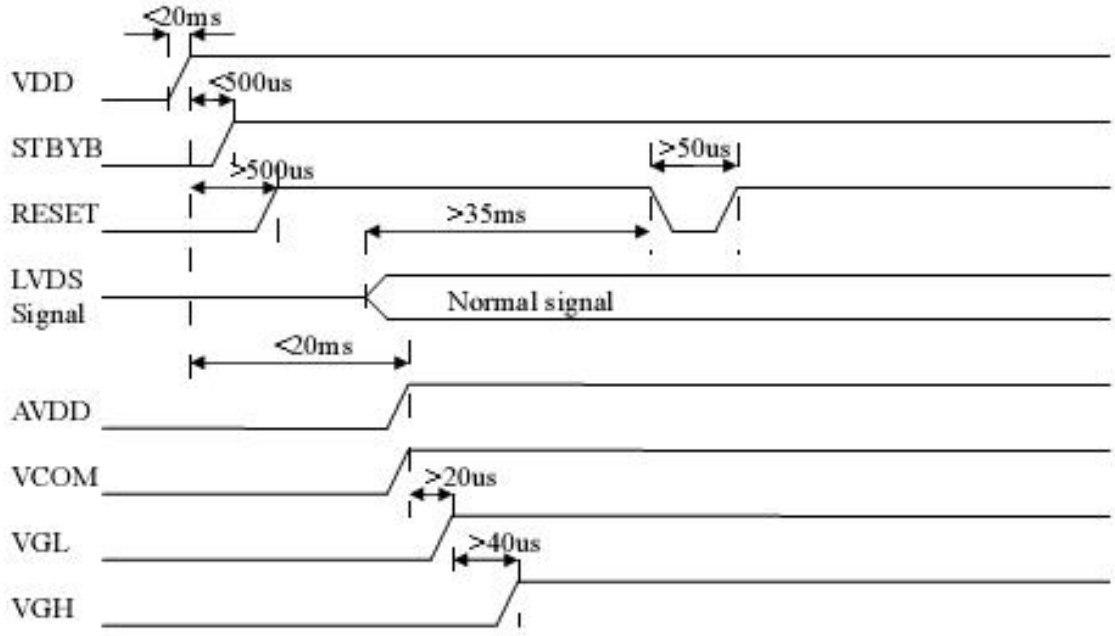
Recommended connector：FH12-6S-0.5SH manufactured by HIROSE

No.	Symbol	Description
1	GND	Ground
2	DP+	Data+ input
3	DN-	Data- input
4	VDD	Power supply
5	NC	No connection
6	NC	No connection

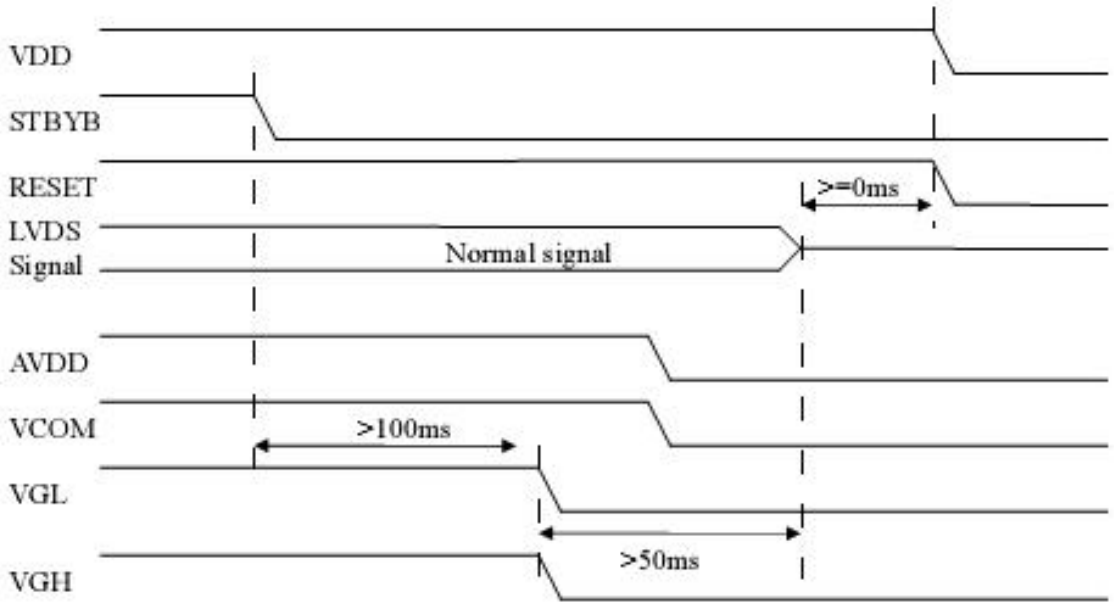
5. Interface Characteristics

5.1 Power sequence

a. Power on:



b. Power off:

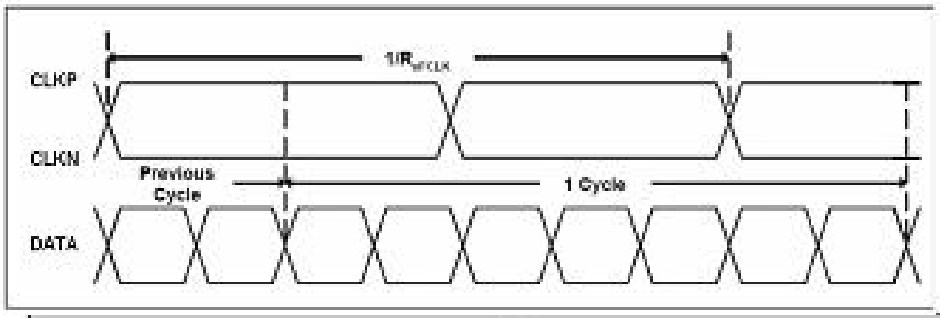


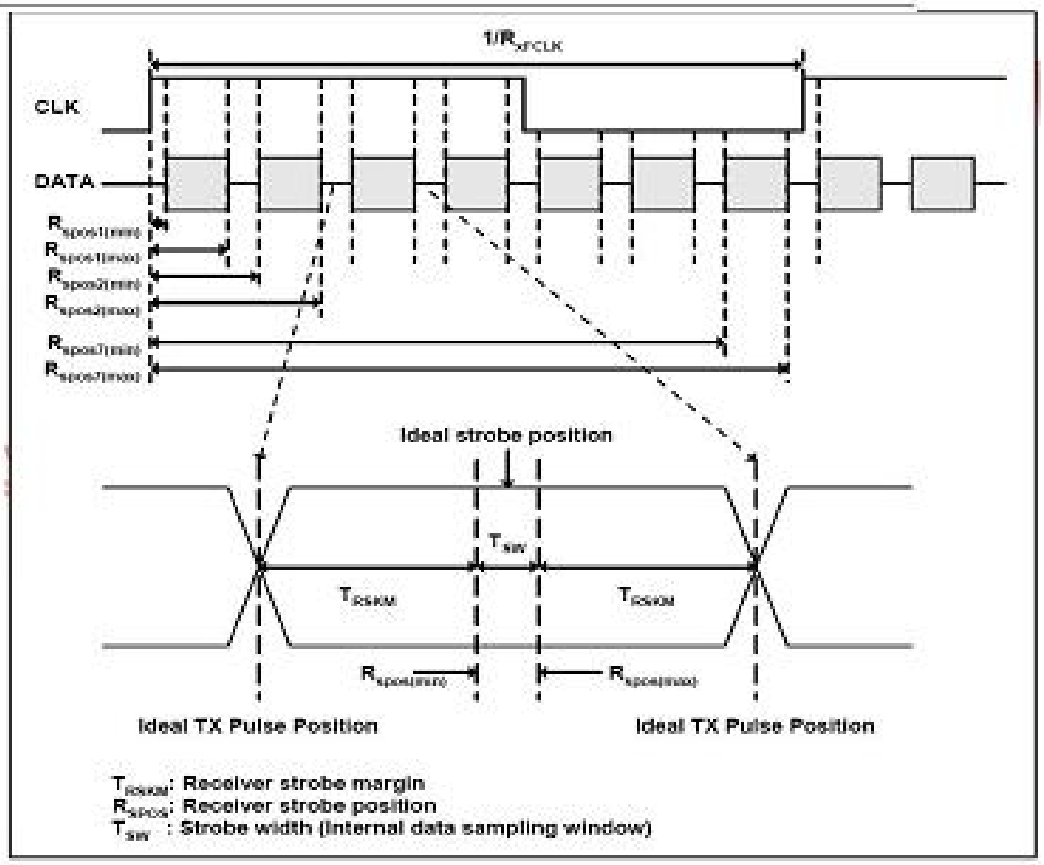
5.2 Timing Characteristics

3.3.1. AC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	40.8	51.2	67.2	MHz	
Input data skew margin	T_{RSKM}	500	-	-	ps	
Clock high time	T_{LVCH}	-	4/(7* R_{xFCLK})	-	ns	
Clock low time	T_{LVCL}	-	3/(7* R_{xFCLK})	-	ns	

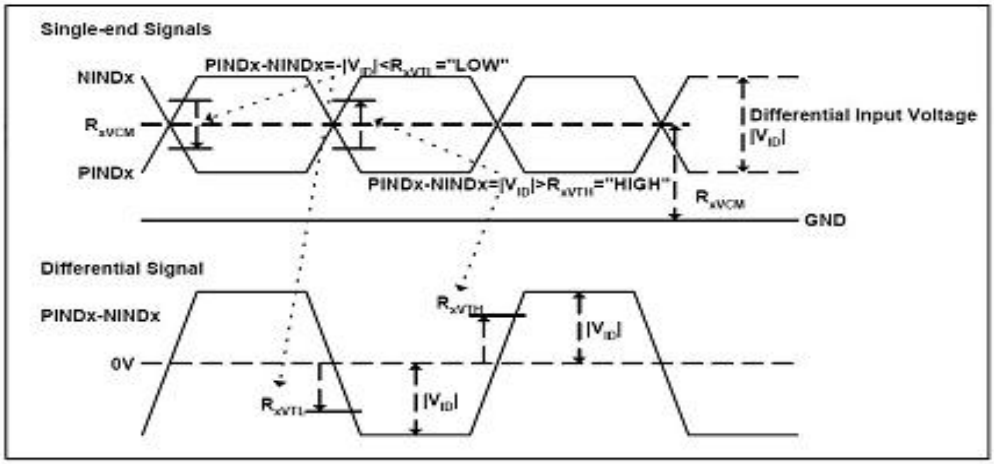
3.3.2. Input Clock and Data Timing Diagram





3.3.3. DC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		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	-	2.4	V	
Differential input common mode voltage	R_{xVCM}	$\|V_{ID}\|/2$	-	$2.4-\|V_{ID}\|/2$	V	
Differential voltage	$\|V_{ID}\|$	0.2	-	0.6	V	
Differential input leakage current	RV_{xIlz}	-10	-	+10	uA	

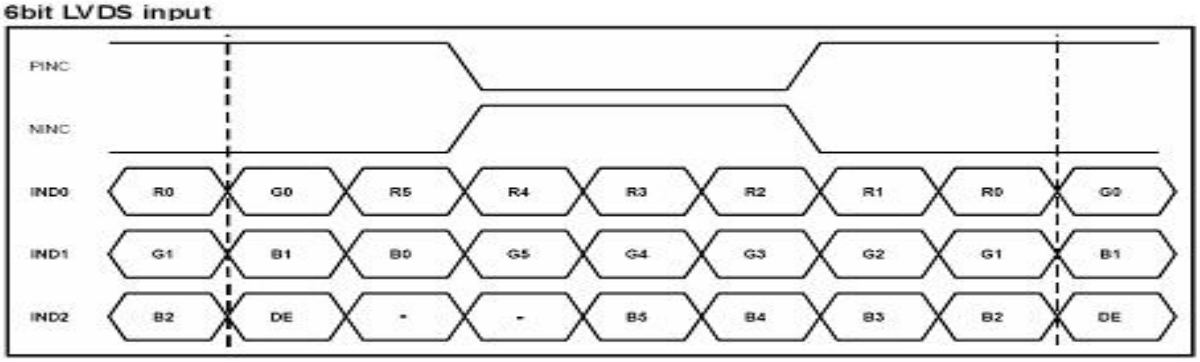


3.3.4. Timing

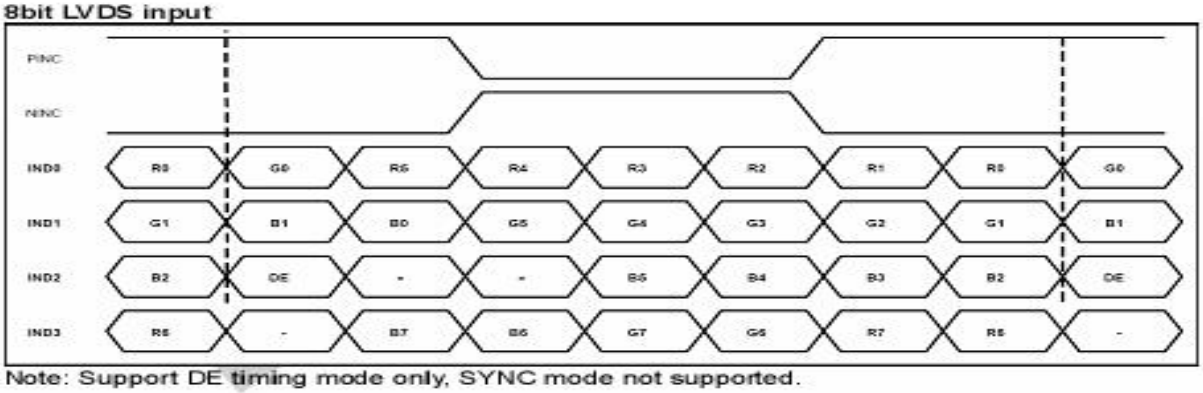
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	fclk	40.8	51.2	67.2	MHz	Frame rate =60Hz
Horizontal display area	thd		1024		DCLK	
HS period time	th	1114	1344	1400	DCLK	
HS Blanking	thb	90	320	376	DCLK	
Vertical display area	tvd		600		H	
VS period time	tv	610	635	800	H	
VS Blanking	thb	10	35	200	H	

3.3.5. Data Input Format

6bit LVDS input



8bit LVDS input



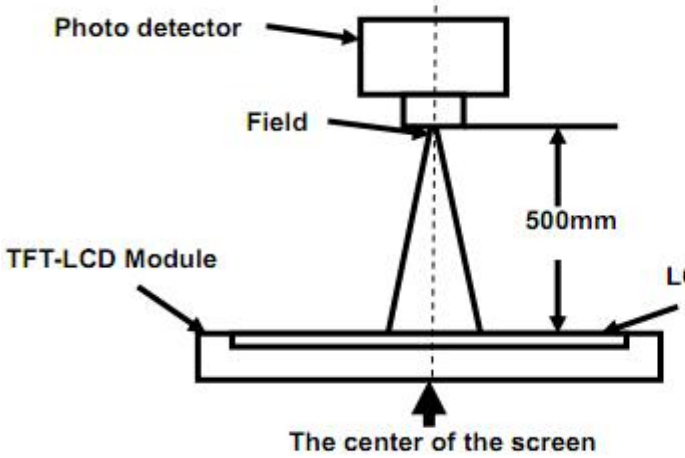
Note: Support DE timing mode only, SYNC mode not supported.

6. Optical Specifications

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR≥10) B/L ON	θ_T	Φ=90°(12 o'clock)	70	80	-	deg	Note2
	θ_B	Φ=270°(6 o'clock)	70	80	-	deg	Note2
	θ_L	Φ=180°(9 o'clock)	70	80	-	deg	Note2
	θ_R	Φ=0°(3 o'clock)	70	80	-	deg	Note2
Response Time	T_{ON}	Normal θ=Φ=0°	-	15	20	msec	Note4
	T_{OFF}		-	15	20	msec	Note4
Contrast Ratio	CR		500	800	-	-	Note1 Note3
Color Chromaticity	W_X		0.258	0.308	0.358	-	Note1 Note5
	W_Y		0.286	0.336	0.386	-	Note1 Note5
Luminance	L		350	400	-	cd/m²	Note1 Note7
Luminance Uniformity	Y_U		75	80	-	%	Note1 Note6
NTSC	-		-	50	-	%	-

Note 1:Definition of optical measurement system

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

Note 2: Definition of viewing angle range and measurement system
Viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).

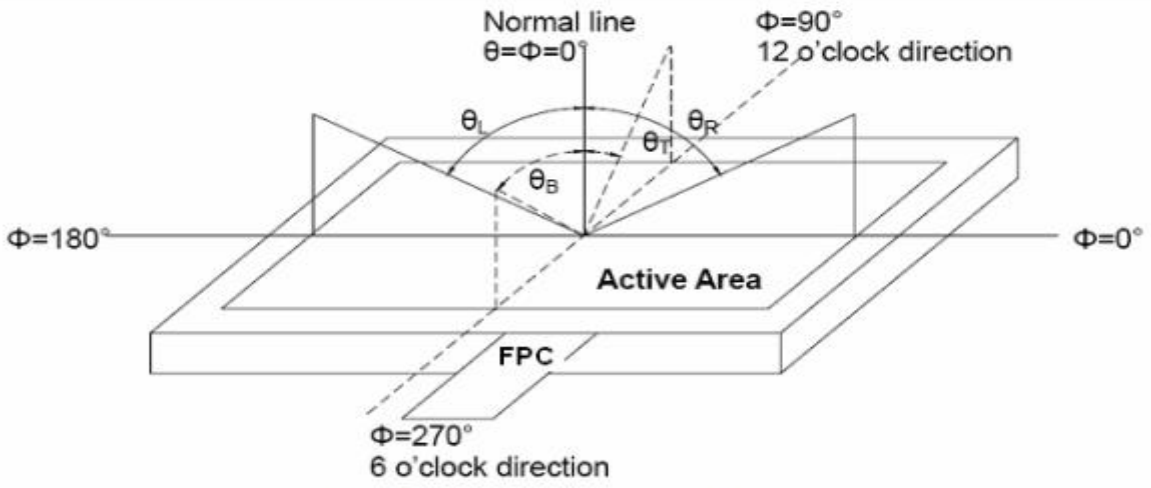


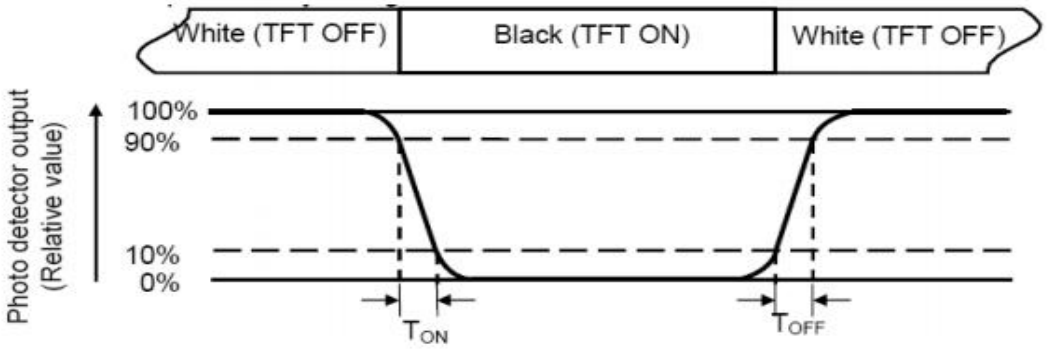
Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note 4: 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%.



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: 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.

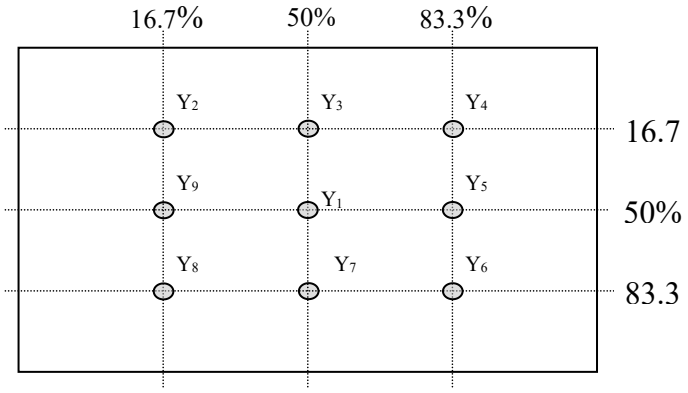


Fig. 2 Definition of points

Note 7: Definition of Luminance (Refer Fig. 2):

Surface luminance is the luminance with all pixels displaying white.

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

7. Reliability Test Items

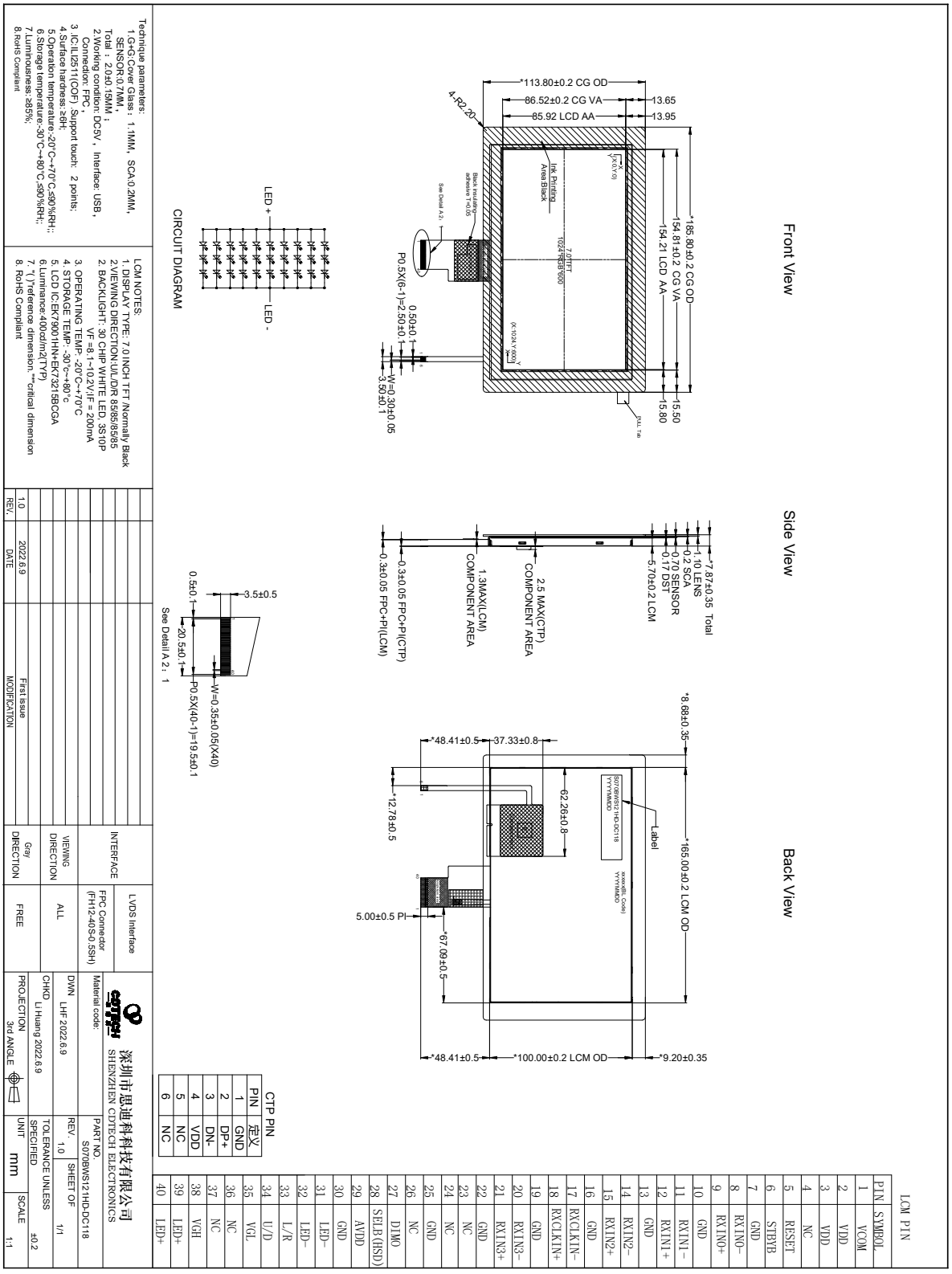
Test Item	Test Conditions	
High Temperature Storage	Ta= +80℃	96hrs
Low Temperature Storage	Ta= -30℃	96hrs
High Temperature Operation	Ta= +70℃	96hrs
Low Temperature Operation	Ta= -20℃	96hrs
High Temperature and Humidity Operation	Ta= +60℃, 90% RH	96hrs
Thermal Shock (Non-operation)	-30℃/30 min ~ +80℃/30 min for 20 cycles Start with cold temperature, end with high temperature	
Electro Static Discharge	Contact = ± 4 kV, class B Air = ± 8 kV, class B R=330Ω,C=150pF	
Vibration	Sweep: 10Hz~55Hz~10Hz Stroke: 1.5mm 2 hrs for each direction of X .Y. Z.	
Mechanical Shock	60G 6ms,±X,±Y,±Z 3 times for each direction	
Package Drop Test	Height: 60 cm, 1 corner, 3 edges, 6 surfaces	

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:

1).Air bubble in the LCD
2).Seal leak or Glass crack
3).Non display or abnormal display
4).Brightness reduction >50%

8. Mechanical Drawing



LCM PIN									
PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL
1	VCOM	11	RXIN1-	21	RXIN3+	31	LED-	40	LED+
2	VDD	12	RXIN1+	22	GND	32	LED-		
3	VDD	13	GND	23	NC	33	L/R		
4	NC	14	RXIN2-	24	NC	34	U/D		
5	RESET	15	RXIN2+	25	GND	35	VGL		
6	STBYB	16	GND	26	NC	36	NC		
7	GND	17	RXCLKIN-	27	DJMO	37	NC		
8	RXIN0-	18	RXCLKIN+	28	SELB (HSD)	38	VGH		
9	RXIN0+	19	GND	29	AVDD	39	LED+		
10	GND	20	RXIN3-	30	GND				

CTP PIN	
PIN	定义
1	GND
2	DP+
3	DN-
4	VDD
5	NC
6	NC

Technique parameters:
1.G+G:Cover Glass： 1.1MM，SCA:0.2MM，SENSOR:0.7MM；
Total： 2.0±0.15MM ；
2.Working condition: DC5V，Interface: USB，Connection: FPC；
3.IC:ILI2511(COF)，Support touch: 2 points;
4.Surface hardness: ≥8H;
5.Operation temperature:-20°C~+70°C;≤90%RH;;
6.Storage temperature:-30°C~+80°C;≤90%RH;;
7.Luminouseness ≥85%;
8.RoHS Compliant

LCM NOTES:
1. DISPLAY TYPE: 7.0 INCH TFT /Normally Black
2.VIEWING DIRECTION:U/L/D/R 85/85/85/85
2. BACKLIGHT: 30 CHIP WHITE LED, 3S10P
VF =8.1~10.2V,IF = 200mA
3. OPERATING TEMP: -20°C~+70°C
4. STORAGE TEMP: -30°C~+80°C
5. LCD IC:EK79001HN+EK73215BCGA
6. Luminance:400cd/m2(TYP)
7. "( )"reference dimension,"*"critical dimension
8. RoHS Compliant

REV.	DATE	MODIFICATION
1.0	2022.6.9	First Issue

INTERFACE	LVDS Interface
	FPC Connector (FH12-40S-0.5SH)
VIEWING DIRECTION	ALL
DIRECTION	FREE
Gray	

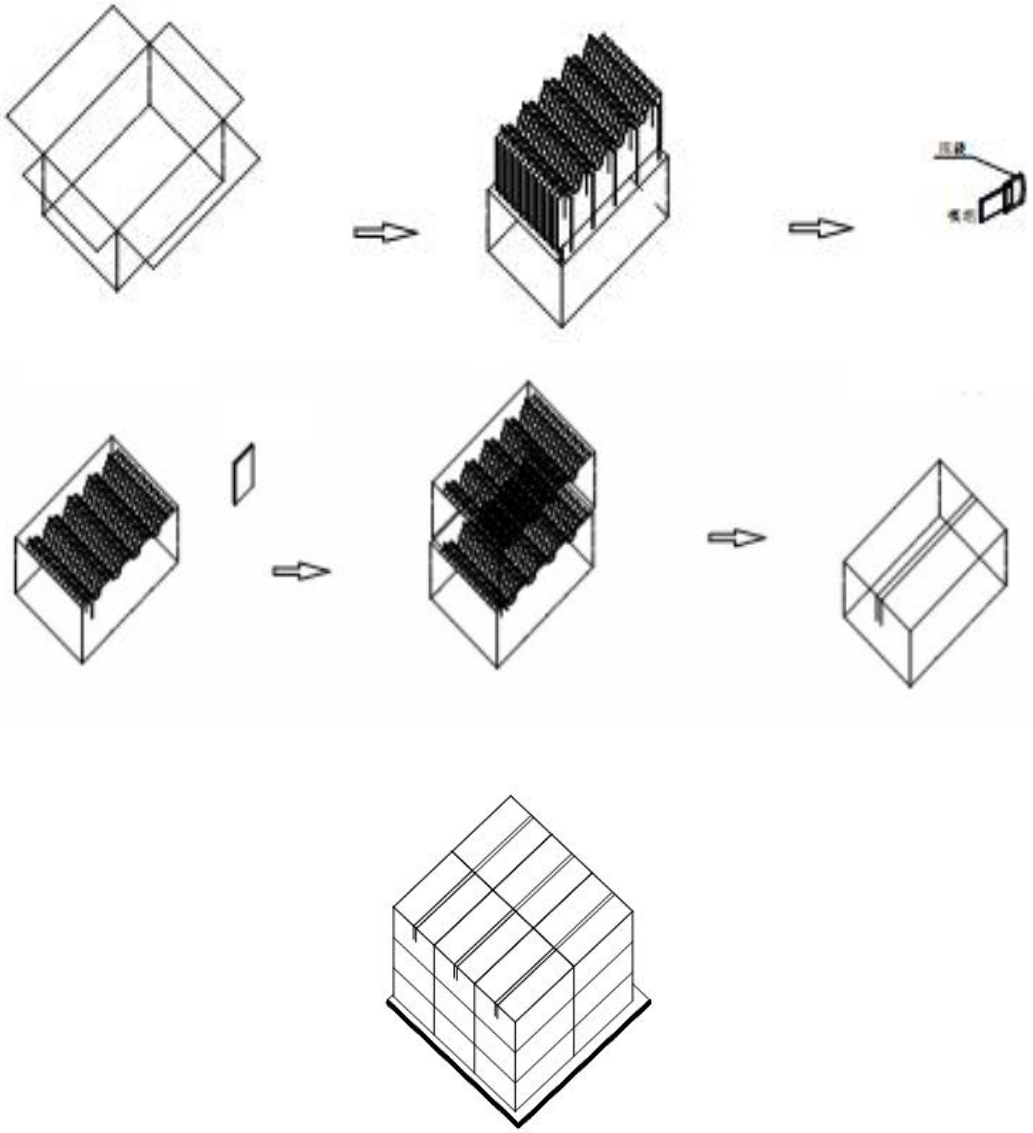
深圳市思迪科科技有限公司 SHENZHEN CDTECH ELECTRONICS

Material code:	
DWN	LHF 2022.6.9
CHKD	Li Huang 2022.6.9
PROJECTION 3rd ANGLE	

PART NO.	S070BWS121HD-DC18
REV.	1.0
SHEET OF	1/1
TOLERANCE UNLESS SPECIFIED	±0.2
UNIT	mm
SCALE	1:1

9. Packing

Packing Method



Steps:
1. Put module into tray cavity
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above
4. Fix the cardboard to the tray stack with adhesive tape
5. Put the tray stack into carton
6. Carton sealing with adhesive tape

10. TFT-LCD Module Inspection Criteria

10.1 Scope

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

10.2 Incoming Inspection

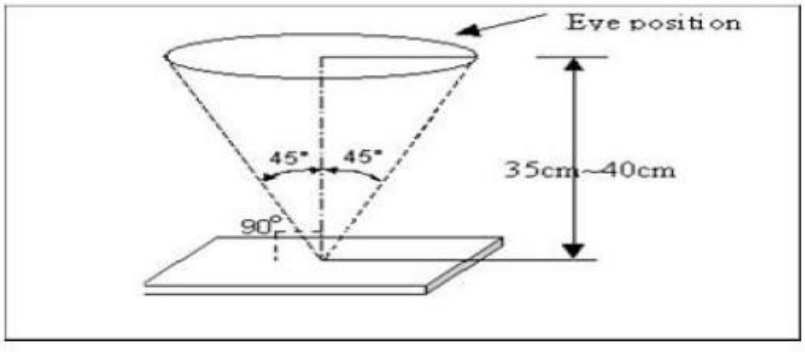
The customer shall inspect the modules within twenty calendar days of the delivery date（the “inspection period）at its own cost. The result of the inspection（acceptance or rejection）shall be recorded in writing, and a copy of this writing will be promptly sent to the seller, If the results of the inspecting 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.

10.3 Inspection Sampling

10.3.1. Lot size: Quantity per shipment lot per model
10.3.2. Sampling type: Normal inspection, Single sampling
10.3.3. Inspection level: II
10.3.4. Sampling table: MIL-STD-105E
10.3.5. Acceptable quality level （AQL ）
Major defect: AQL=0.65
Minor defect: AQL=1.00

10.4 Inspection Conditions

10.4.1 Ambient conditions:
a. Temperature: Room temperature 25±5℃
b. Humidity: (60±10) ％RH
c. Illumination: Single fluorescent lamp non-directive (300 to 700 Lux)
10.4.2 Viewing distance
The distance between the LCD and the inspector’s eyes shall be at least 35±5 cm.
10.4.3 Viewing Angle
U/D: 45 °/45°, L/R: 45°/45°



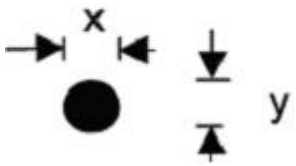
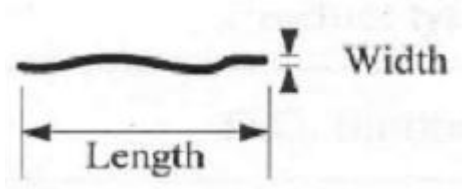
10.5 Inspection Criteria

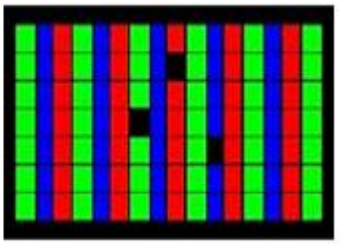
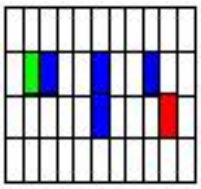
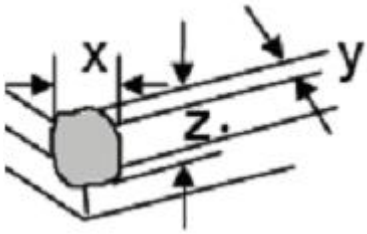
Defects are classified as major defects and minor defects according to the degree of defectiveness defined here in.

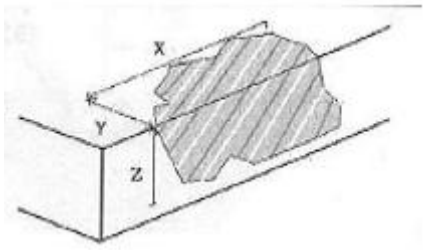
10.5.1 Major defect

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

10.5.2 Minor defect

<table>
<tr><th>Item No</th><th>Items to be inspected</th><th colspan="2">Inspection standard</th></tr>
<tr><td rowspan="5">5.2.1</td><td rowspan="5">Spot Defect
Including Black spot White spot
Pinhole
Foreign particle
Polanizer dirt</td><td colspan="2">For dark/white spot is defined
$\varphi = (x+y)/2$
  </td></tr>
<tr><td>Sizeφ(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>φ≤0.2</td><td>Ignore</td></tr>
<tr><td>0.2 < φ≤0.35</td><td>3</td></tr>
<tr><td>0.35 <φ</td><td>Not allowed</td></tr>
<tr><td rowspan="3">5.2.2</td><td rowspan="3">Line Defect
Including Black line White line
Scratch</td><td colspan="2">Define:
  </td></tr>
<tr><td>Width(mm)
Length(mm)</td><td>Acceptable Quantity</td></tr>
<tr><td>W≤0.05</td><td>Ignore</td></tr>
</table>

		0.05 < W≤0.1 L≤2.5	4
		0.1 < W,or L>2.5	Not allowed
5.2.3	Polarizer Dent/Bubble	Sizeφ(mm)	Acceptable Quantity
		φ≤0.2	Ignore
		0.2 < φ≤0.35	3
		0.35<φ	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	1.Corner Fragment: 	
		Size(mm)	Acceptable Quantity
		X≤3mm Y≤1mm Z≤T	Ignore T:Glass thickness X: Length

			Y: Width Z: thickness
		2. Side Fragment: 	
		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.

10.6 Mechanics specification

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

11. Precautions for Use of LCD modules

11.1 Handling Precautions

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

11.1.2. 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.

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

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

11.1.5. 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
- Aromatic solvents

11.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

11.1.8.4. 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.

11.2 Storage Precautions

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

11.2.2.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℃ ~40℃ Relatively humidity: ≤80%

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

11.3 Transportation Precautions

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