PRODUCT SPECIFICATION

CDTECH Model: **S156AWU10EP-FC14-GFR**

CUSTOMER Model: -

Description: **15.6 ” TFT-LCD Module with CTP**

Version: **1.0**

CDTECH	PREPARED BY	CHECKED BY	APPROVED BY
SIGNATURE			
DATE	2025.12.11	2025.12.11	2025.12.11

CUSTOMER APPROVAL	SIGNATURE	DATE

Record of Revisions

Version	Revise Date	Description	Page
1.0	2025-12-11	First Release	-

Contents

1. General Specifications

1.1 LCM General Information

Item	Specification	Unit
LCD Size	15.6	inch
Number of Pixels	1920 (H) RGB x 1080 (V)	pixels
Display Mode	Normally Black	-
Viewing Direction	Free	-
Interface	LVDS	-
Display Colors	16.7M	colors
Outline Dimension	359.30 (H) x 216.54 (V) x 8.66 (D)	mm
Active Area	344.16 (H) x 193.59 (V)	mm
Pixel Pitch	0.1792 (H) x 0.1792 (V)	mm
Driver IC	-	-
Operation Temperature	-20~70	℃
Storage Temperature	-30~80	℃

1.2 Touch Panel Information

Item	Specification
Touch Structure	G+G
Bonding Type with LCM	OCA Optical Bonding
Driver IC	ILI2511
Interface	USB
Touch Count Max	10 Points
Surface treatment	AG+AF+AR
Surface hardness	6H
I2C slave address	0x82
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	LCD VDD	-0.3	4	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

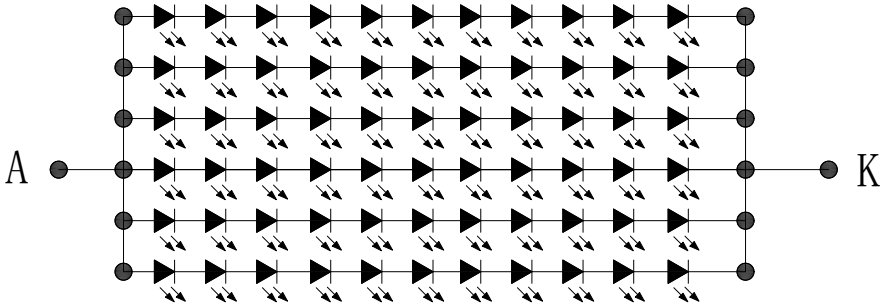
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Analog Supply voltage	LCD VDD	3.0	3.3	3.6	V	
Analog supply current	$I_{LCD\ VDD}$	-	400	520	mA	LCD VDD=3.3V (RED)
Logic input voltage	VIH	0.7*LCD VDD	-	LCD VDD	V	
	VIL	GND	-	0.3*LCD VDD	V	

3.2 Recommended Driving Condition for Backlight

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Driving Current	I_F	-	480	-	mA	
Driving Voltage	V_F	29.7	-	37.4	V	
Power consumption	W_{BL}	14.256	-	17.952	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	VBUSIN	-	5.0	-	V	
Analog supply current	I_{VBUSIN}	-	100	-	mA	VBUSIN=5.0V
Input high-level voltage	VIH	0.7*VBUSIN	-	VBUSIN	V	
Input low -level voltage	VIL	GND	-	0.3*VBUSIN	V	

4. Interface Pin Assignment

4.1 LCM Pin Assignment

No.	Symbol	Description
1	NC	No connection
2	NC	No connection
3	NC	No connection
4	NC	No connection
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	NC	No connection
10	NC	No connection
11	LCD VCC 3.3V	Power supply (3.3V)
12	LCD VCC 3.3V	Power supply (3.3V)
13	LCD VCC 3.3V	Power supply (3.3V)
14	NC	No connection
15	NC	No connection
16	NC	No connection
17	GND	Ground
18	RXO0-	-LVDS differential data input
19	RXO0+	+LVDS differential data input
20	RXO1-	-LVDS differential data input
21	RXO1+	+LVDS differential data input
22	RXO2-	-LVDS differential data input
23	RXO2+	+LVDS differential data input
24	GND	Ground
25	RXOC-	-LVDS differential clock input
26	RXOC+	+LVDS differential clock input
27	GND	Ground
28	RXO3-	- LVDS differential data input
29	RXO3+	+ LVDS differential data input
30	RXE0-	-LVDS differential data input
31	RXE0+	+LVDS differential data input
32	RXE1-	-LVDS differential data input
33	RXE1+	+LVDS differential data input
34	GND	Ground
35	RXE2-	-LVDS differential data input
36	RXE2+	+LVDS differential data input

37	RXEC-	-LVDS differential clock input
38	RXEC+	+LVDS differential clock input
39	RXE3-	-LVDS differential data input
40	RXE3+	+LVDS differential data input

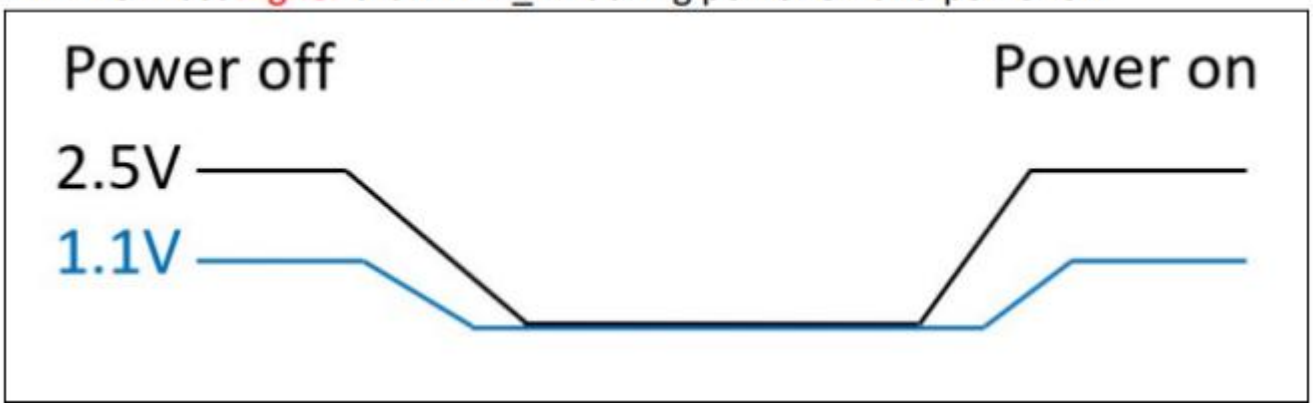
4.2 Touch FPC Pin Assignment

No.	Symbol	Description
1	VBUSIN	Power supply for CTP
2	DN	Data- input
3	DP	Data+ input
4	GNDIN	Ground

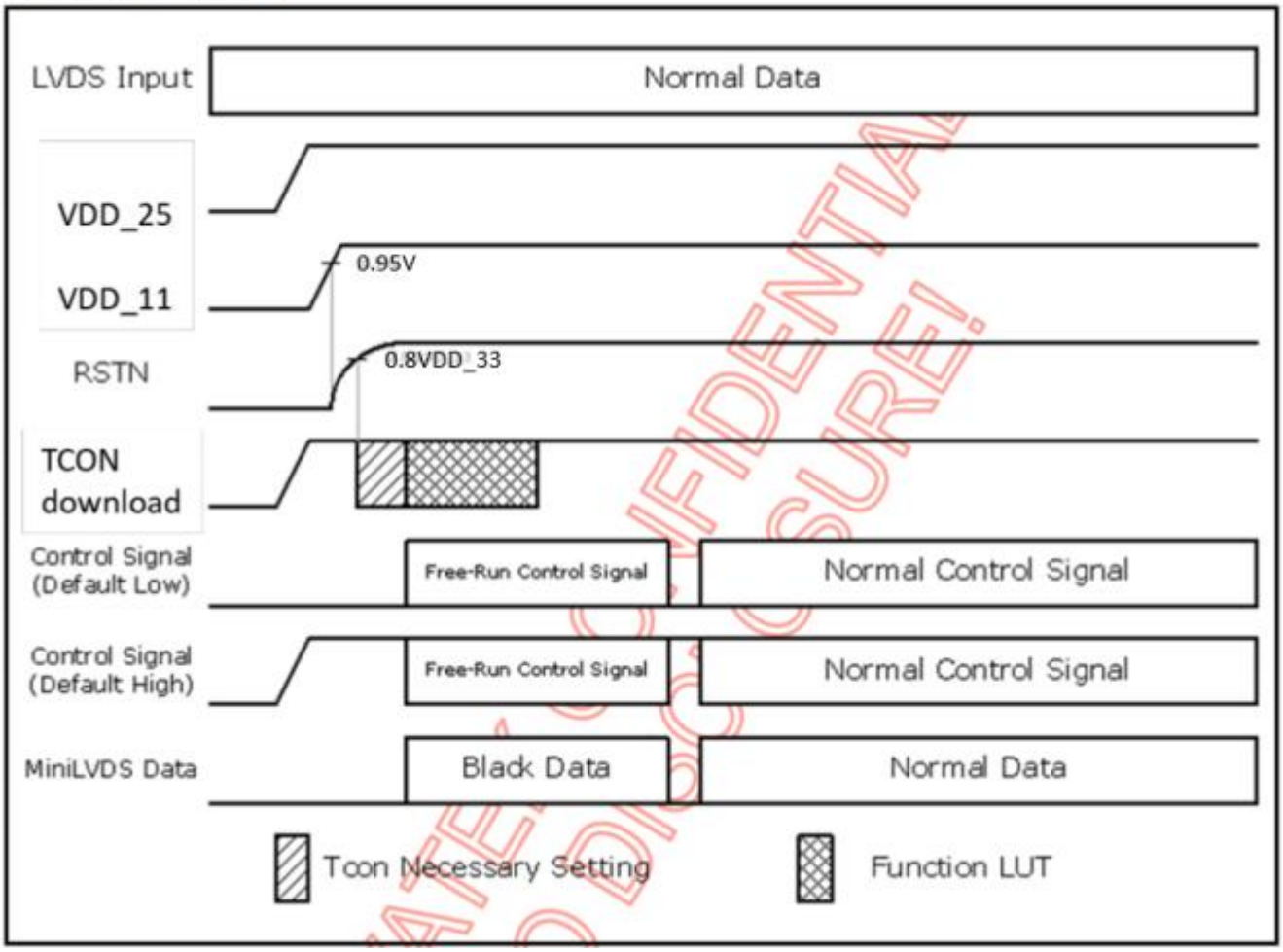
5. Interface Characteristics

5.1 Power Sequence

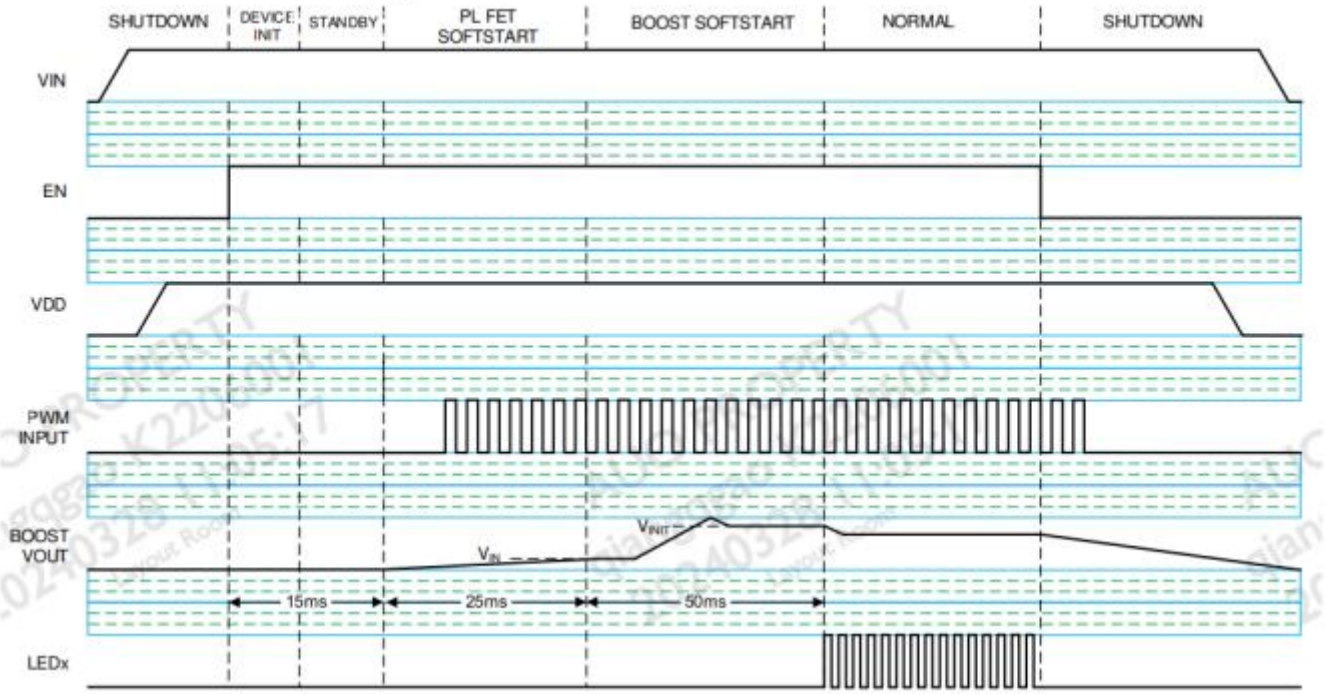
VDD25 must higher than VDD_11 during power on and power off



Power on Sequence



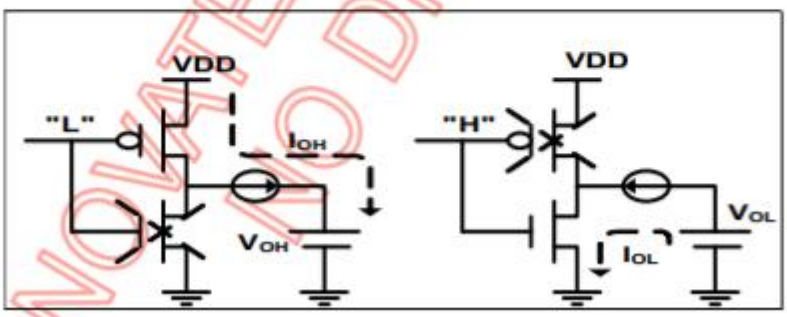
LED Driver IC Power on Sequence



5.2 DC Characteristics

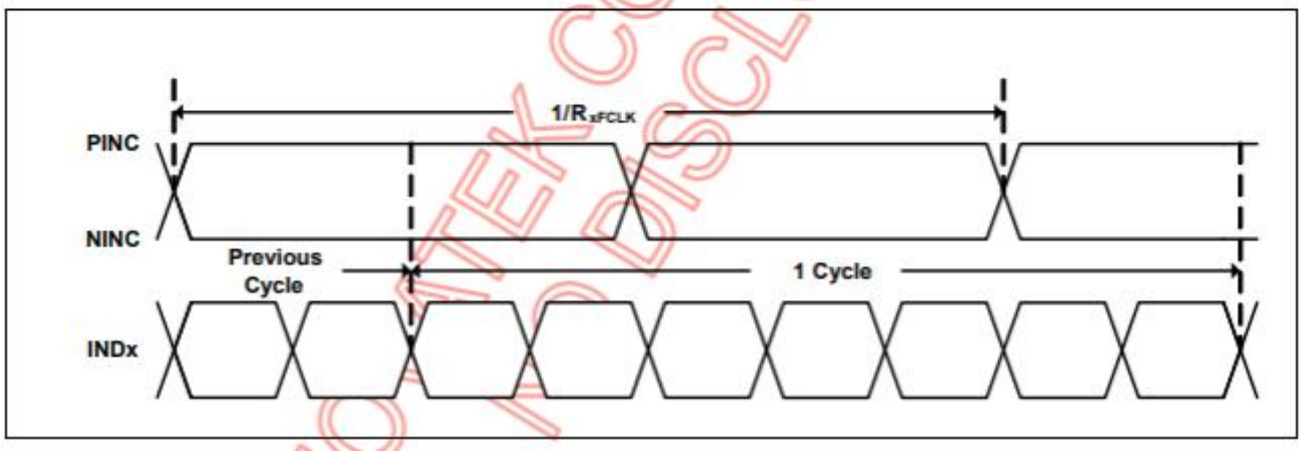
Recommended Operating Conditions						
Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
LVDD_25 VCCIO_25 VCCTX_25	Supply Voltage	2.25	2.5	2.75	V	For 2.5V application case
VCC_11 VMM_11 VCCTX_11	Supply voltage	1.0	1.1	1.2	V	
△VMM	Supply power noise			100	mV	

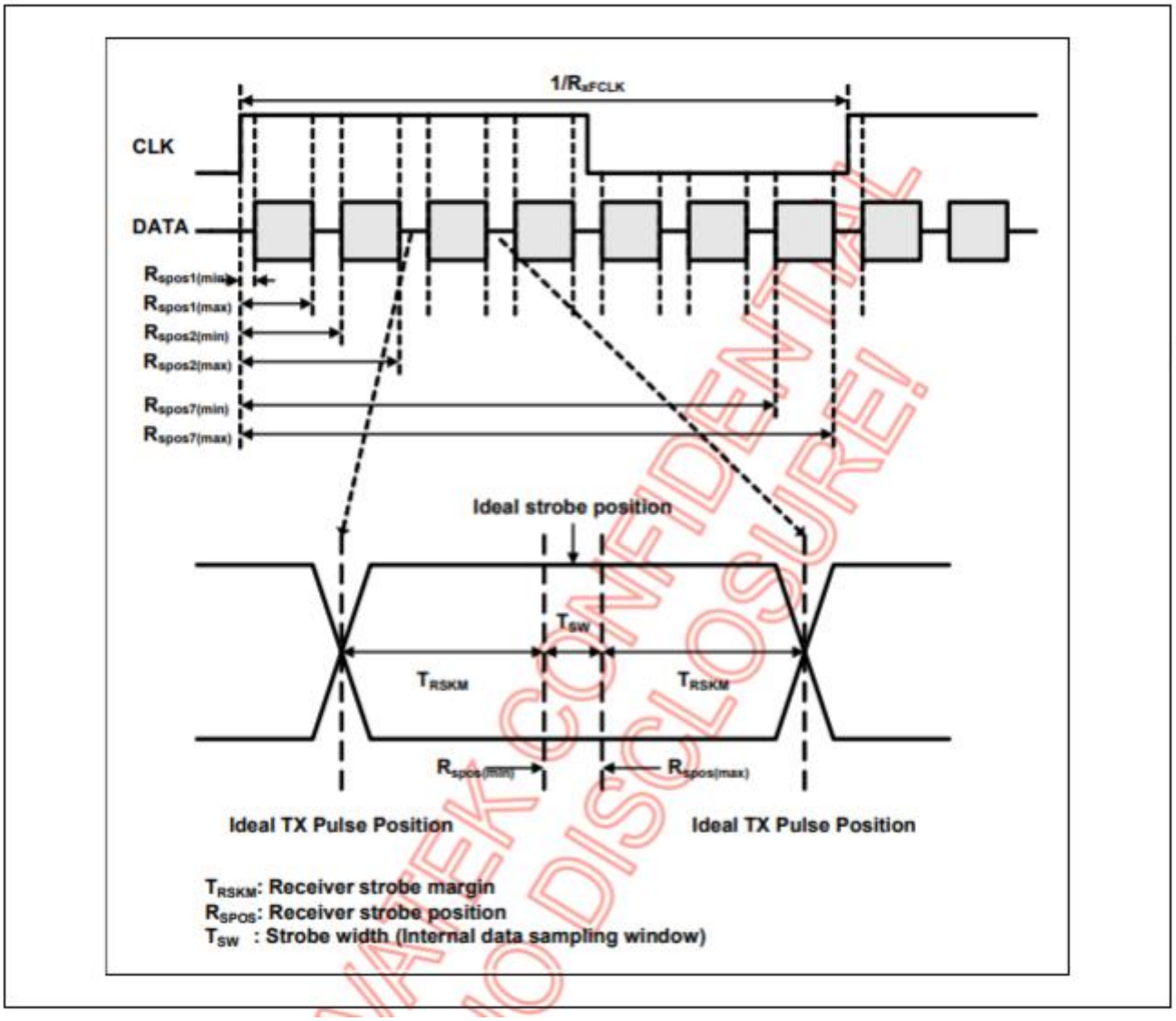
Output Control Signals						
Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
V_{OH}	High-level output voltage	1.9			V	VCCIO_25=2.5V @ I_{OH} = -3mA(E4E2=01)
V_{OL}	Low-level output voltage			0.4	V	VCCIO_25=2.5V @ I_{OL} = 3mA(E4E2=00)



5.3 AC Characteristics

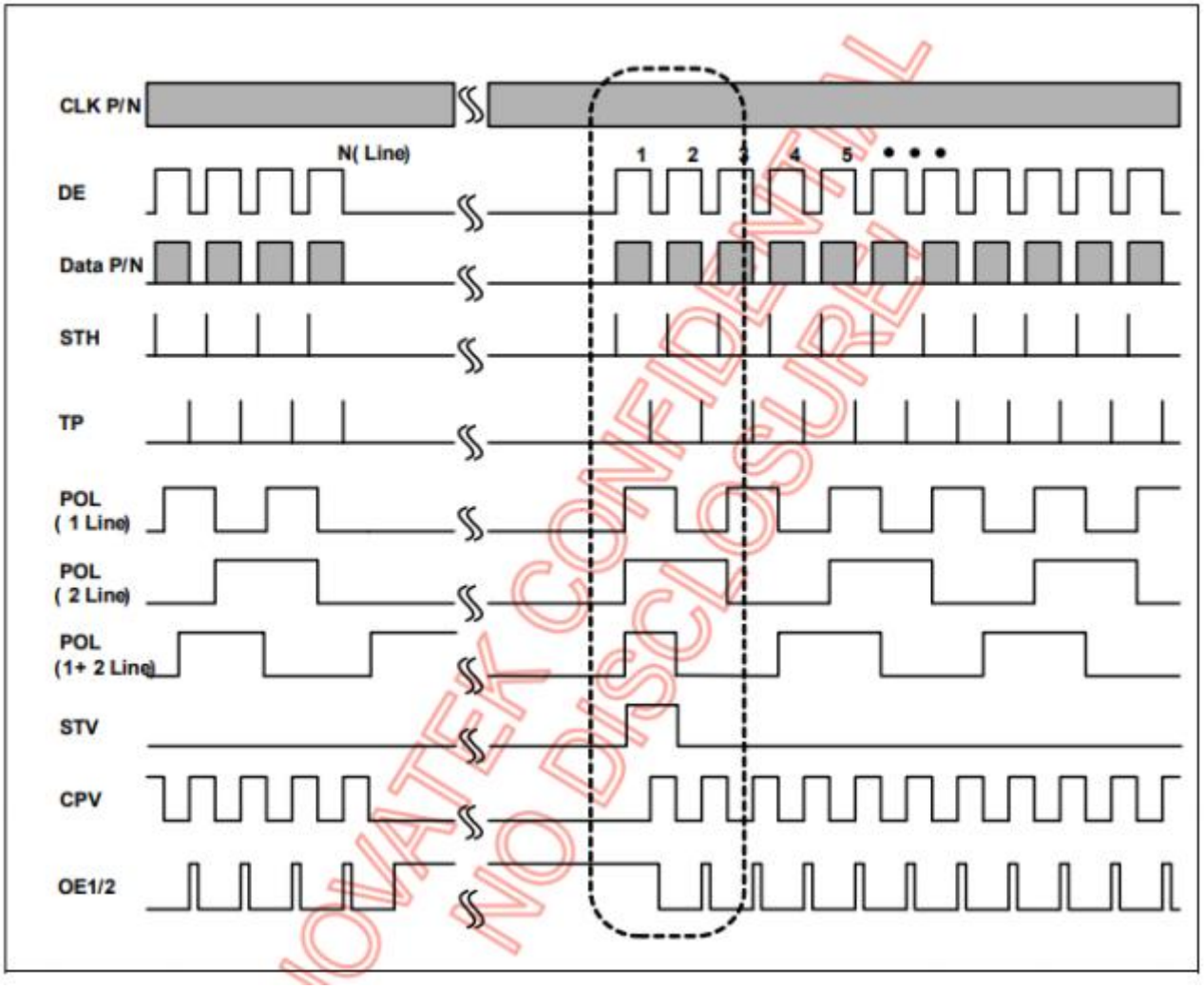
LVDS Receiver Differential Input						
Symbol	**Parameter**	**Min.**	**Typ.**	**Max.**	**Unit**	**Condition**
R_{xFCLK}	Clock frequency	20		120	MHz	
T_{RSKM}	Input data skew margin	-350		+350	ps	**120Mhz for 2Port only** LVDD_25=2.5V Rxclk=**120M** VID=400mV RXVCM=1.2V
		-380		+380	ps	LVDD_25=2.5V Rxclk=100M VID=400mV RXVCM=1.2V
F_{MODU}	Input LVDS Signal Modulation Frequency	30		300	KHz	
R_{MODU}	Input LVDS Signal Modulation Range			+/-3	%	





5.4 Timing

Data Input Format for LVDS



Input Timing Characteristics

ITEM	Symbol	Min.	Typ.	Max.	Unit
Clock frequency	F_{DCLK}	138	150	165	MHz
Horizontal period area	T_H	2200	2240	2280	DCLK
Horizontal display area	T_{HD}	1920	1920	1920	DCLK
Horizontal blanking area	T_{HB}	280	320	360	DCLK
Vertical period area	T_V	1110	1115	1120	T_H
Vertical display area	T_{VD}	1080	1080	1080	T_H
Vertical blanking area	T_{VB}	30	35	40	T_H
Frame rate	F_R	55	60	65	Hz

Internal VCO OSC timing Specification

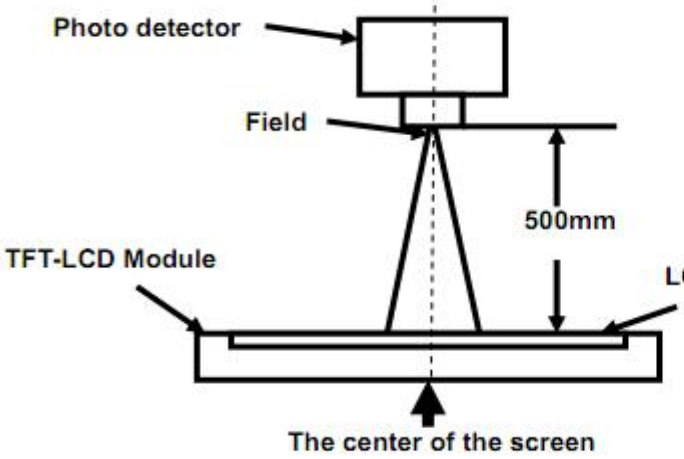
Internal Built-in Oscillator						
Symbol	**Parameter**	**Min.**	**Typ.**	**Max.**	**Unit**	**Condition**
fosc	Internal oscillator frequency	91.2	96	100.8	MHz	+/-5% 0~85 degrees With thermal compensation

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)	80	85	-	deg	Note2
	θ_B	Φ=270°(6 o'clock)	80	85	-	deg	Note2
	θ_L	Φ=180°(9 o'clock)	80	85	-	deg	Note2
	θ_R	Φ=0°(3 o'clock)	80	85	-	deg	Note2
Response Time	T_{ON}	Normal θ=Φ=0°	-	12	15	msec	Note4
	T_{OFF}		-	12	15	msec	Note4
Contrast Ratio	CR		700	800	-	-	Note1 Note3
Color Chromaticity	W_X		0.2976	0.3276	0.3576	-	Note1 Note5
	W_Y		0.3448	0.3748	0.4048	-	Note1 Note5
Luminance	L		800	900	-	cd/m²	Note1 Note7
Luminance Uniformity	Y_U		70	80	-	%	Note1 Note6
NTSC	-		67	72	-	%	-

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°

Fig 1

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).

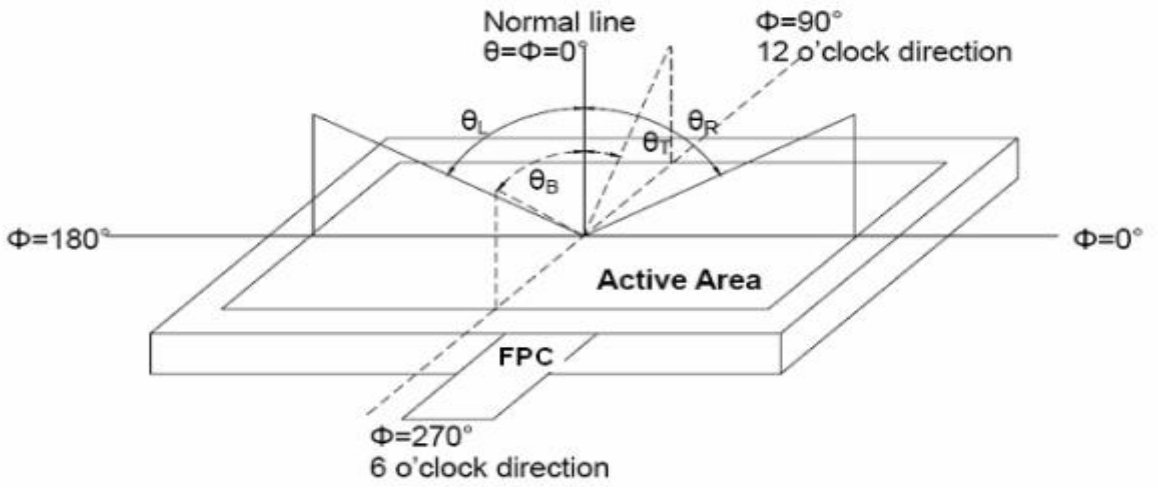


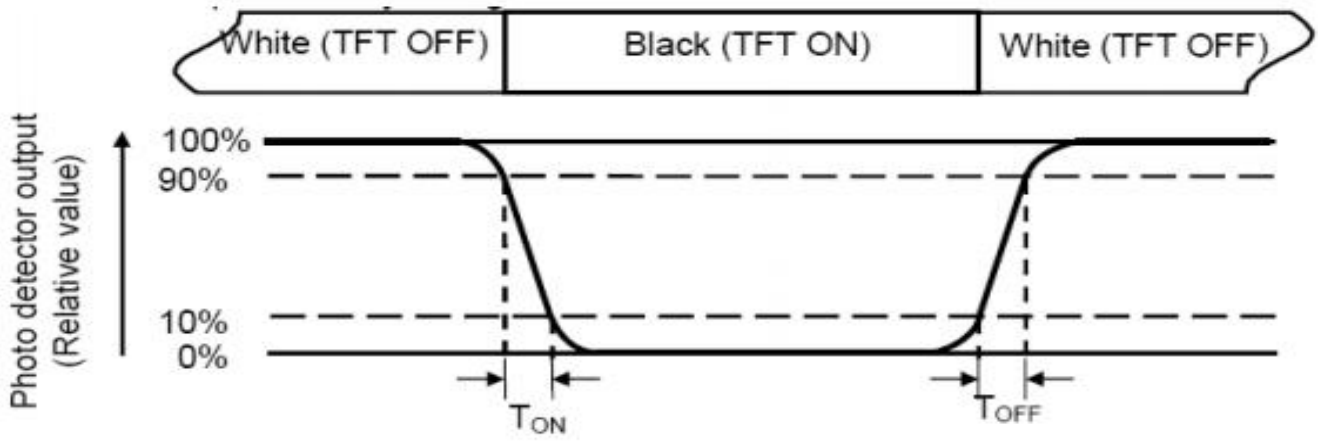
Fig 2　Definition of viewing angle

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.3-a/b

Note 7:Surface luminance is the luminance with all pixels displaying white.

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

For more information see FIG.3-a/b

Note 8:

H,V : Active area(see Figure b)

Light spot size ⌀ =5mm(BM-5) or ⌀ =7.7mm (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 SR-3A or BM-7 or compatible (see Figure 1).

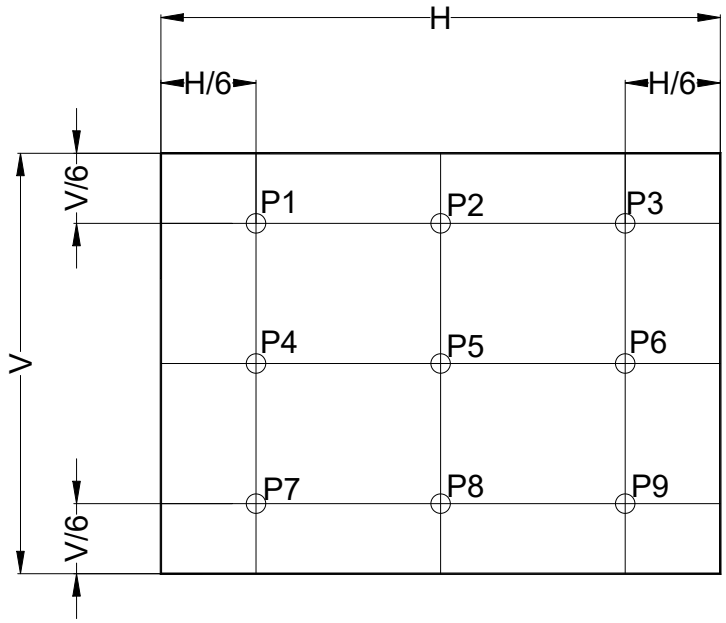


Fig. 3-b Definition of points

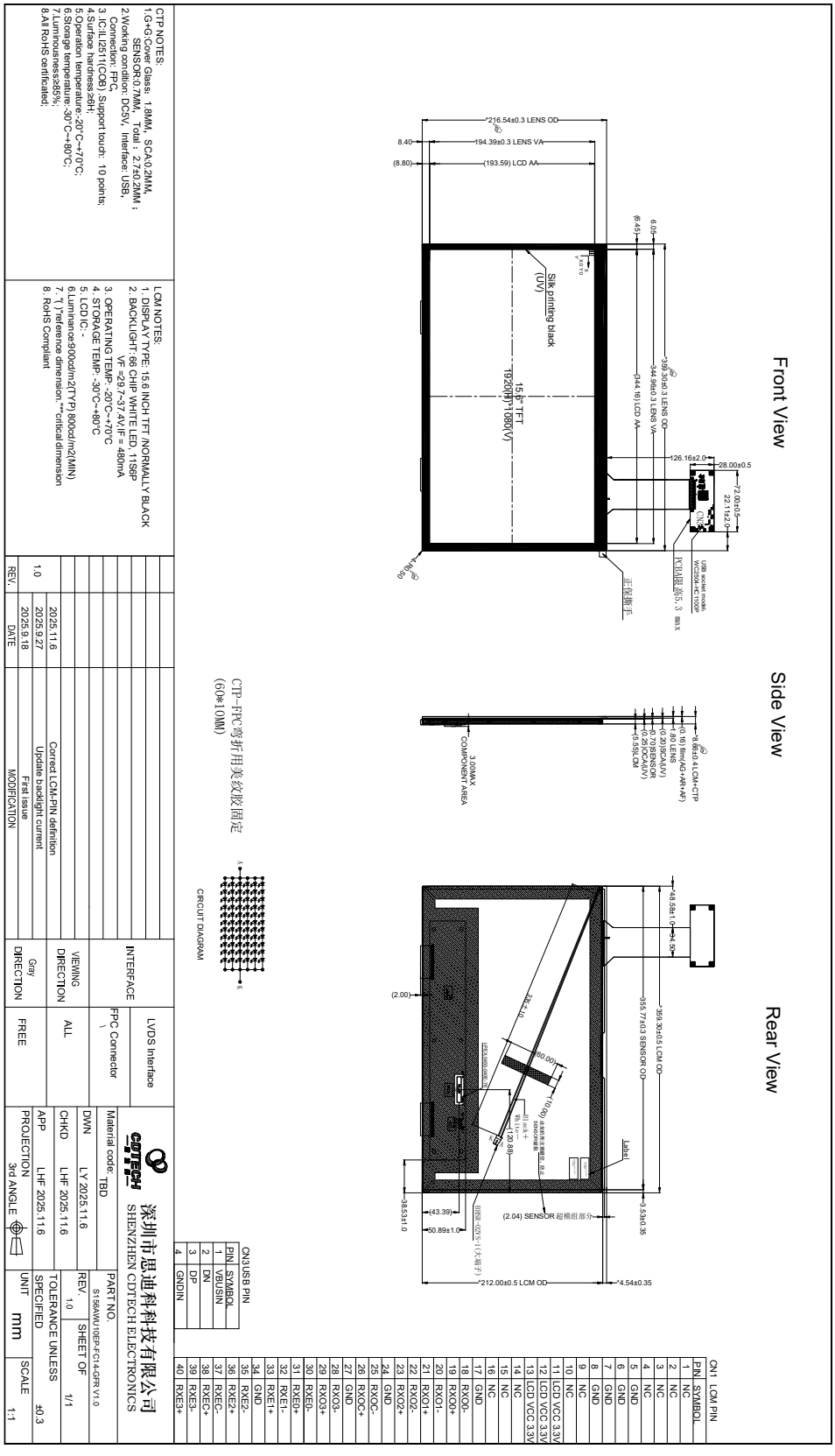
7. Reliability Test Items

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 Storage	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: 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:

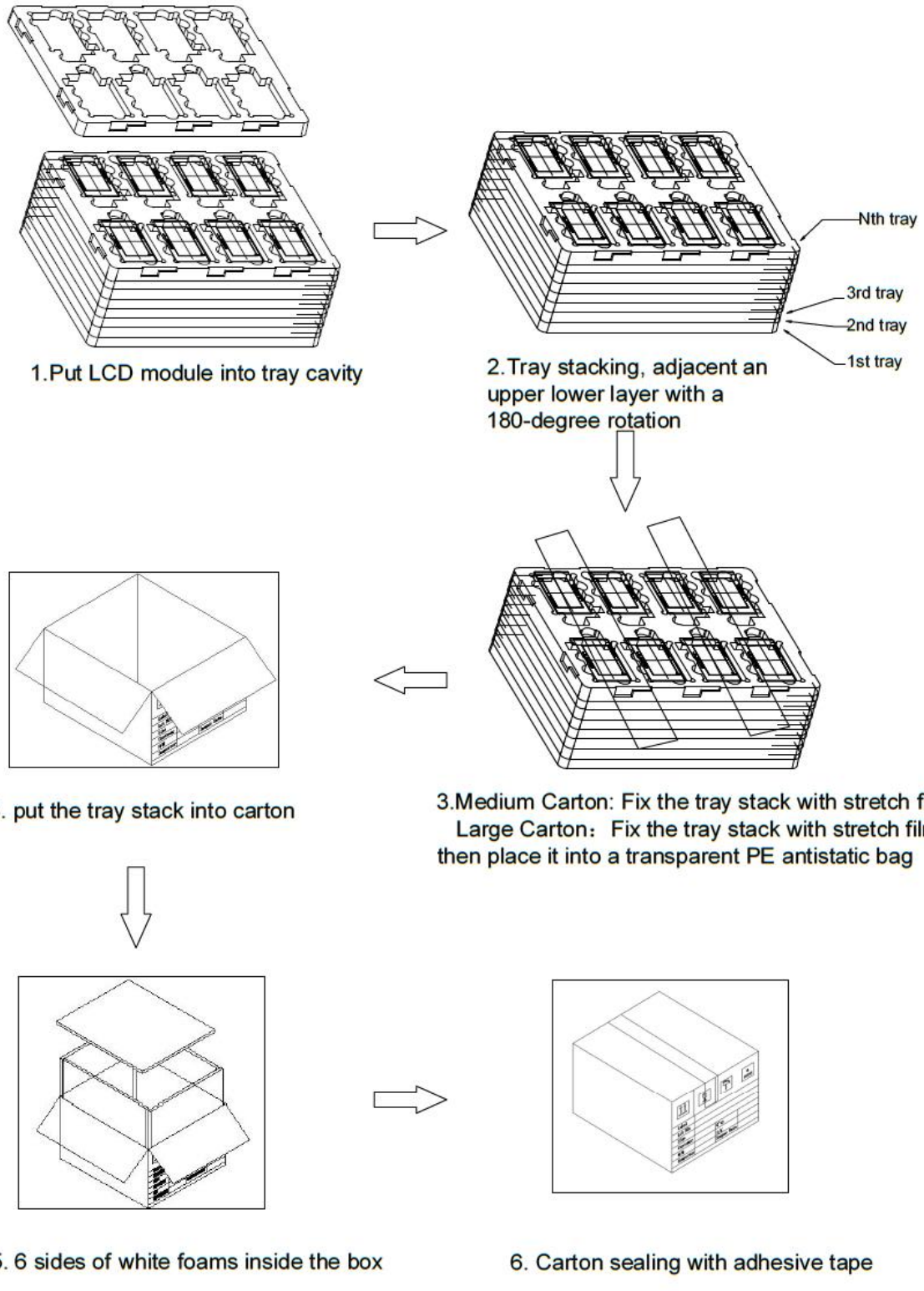
1). Air bubble in the LCD
2). Seal leak or Glass crack
3). Non display or abnormal display
4). Brightness reduction >50%

8. Mechanical Drawing



9. Packing

Packing Method



10. Precautions for Use of LCD modules

10.1 Handling Precautions

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

10.1.2. 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.

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

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

10.1.5. 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

10.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

10.1.8.4. 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.

10.2 Storage Precautions

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

10.2.2.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%

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

10.3 Transportation Precautions

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

10.4 Packaging instructions

When the customers using trays, they have to stack the adjacent trays in a 180° staggered to prevent pressure that could cause product damage.