

Product Specifications

Customer	
Model Name	FTT070WV94H-T
Description	Standard LCD Module 800(RGB)x480 Dots 7.0" TFT LCD
Date	2015/12/21
Revision	1.0

Customer Approval	
Date	
The above signature represents that the product specifications, testing regulation, and warranty in the specifications are accepted	

Engineering			
Check	Date	Prepared	Date

Table of Contents

1. Record of Revision.....	3
2 General Specifications.....	4
3 Input/Output Terminals	5
4 Absolute Maximum Ratings.....	7
5 Electrical Characteristics.....	8
6 Optical Characteristics	12
7 Environmental / Reliability Tests	16
8 Mechanical Drawing.....	16
9 Packing	19
10 Precautions For Use of LCD modules.....	18
11. Appendix: backlight improvements.....	19
12. LED backlight structure drawing.....	22

2 General Specifications

	Feature	Spec
Characteristics	Size	7 inch
	Resolution	800(horizontal)*480(Vertical)
	Interface	24-bit RGB
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Display Spec. Pixel pitch (mm)	0.193 x 0.179
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally White
	Driver IC	HX8264-D08+HX8664-B00B
	Surface Treatment	HC
	Viewing Direction	12 O'clock
	Gray Viewing Direction	6 O'clock
Mechanical	LCM (W x H x D) (mm)	164.9*100*6.9
	Active Area(mm)	154.08 x 85.92
	With /Without TSP	With TSP
	Weight (g)	TBD
	LED Numbers	27 LEDs

Note 1: Viewing direction is follow the data which measured by optics equipment.

Note 2: Requirements on Environmental Protection: RoHS

Note 3: LCM weight tolerance: +/- 5%

3 Input/Output Terminals

No.	Symbol	Description
1,2	VLED+	Power for LED backlight anode
3,4	VLED-	Power for LED backlight cathode
5	GND	Ground
6	VCOM	Common voltage
7	DVDD	Power for Digital Circuit
8	MODE	DE/SYNC mode select
9	DE	Data input Enable
10	VS	Vertical sync signal
11	HS	Horizontal sync Signal
12~19	B7~B0	Data bus
20~27	G7~G0	Data bus
28~35	R7~R0	Data bus
36	GND	Power ground
37	DCOLK	Sample clock
38	GND	Power ground
39	L/R	Left/right selection
40	U/D	Up/down selection
41	VGH	Gate on voltage
42	VGL	Gate off voltage
43	AVDD	Power for analog circuit
44	RESET	Global reset pin
45	NC	NO connection
46	VCOM	Common Voltage
47	DITHB	Dither function
48	GND	Power ground
49~50	NC	NO connection
TP PIN		
1	XL	The left side signal pin of TP
2	YD	The bottom side signal pin of TP
3	XR	The right side signal pin of TP
4	YU	The top side signal pin of TP

1:input,0:output ,P:Power

Note 1:DE/SYNC mode select.Normally pull high

When select DE mode ,MODE="1",VS dnd HS must high

When select SYNC mode ,MODE="0",DE must be grounded

Note 2: when input 18 bit PGB date ,the two low bit of R,G and B and must be grounded

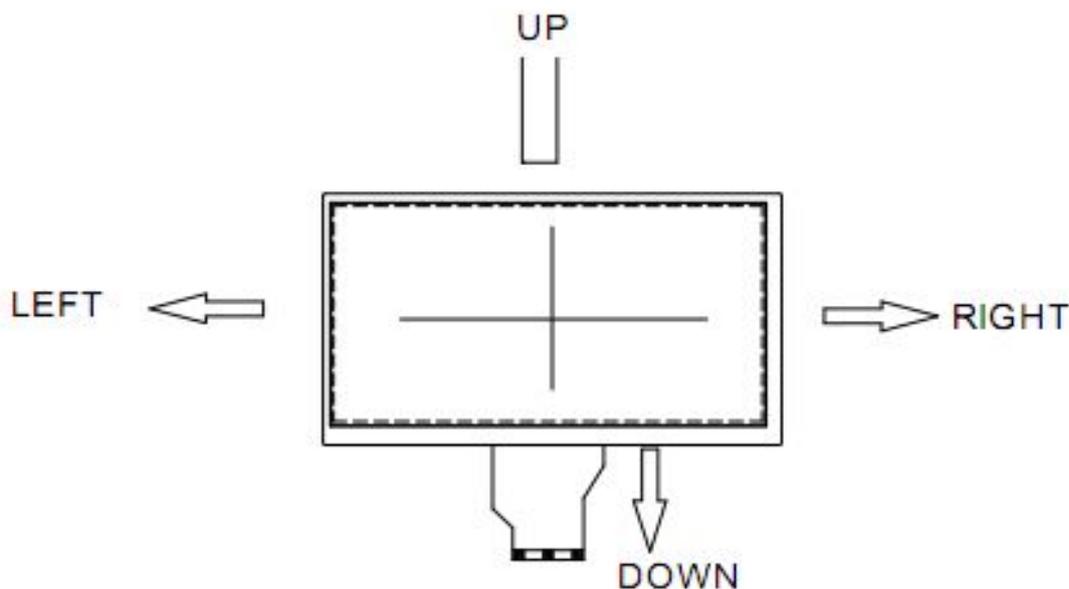
Nore 3: Data shall be latched at the falling edge of DCLK

Note 4: Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	L/R	
GND	DVDD	Up to down left to right
GVDD	GND	Down to up right to left
GND	GND	Up to down right to left
DVDD	DVDD	Down to up left to right

Note5: Definition of scanning direction

Refer to the figure as below



Note 6: Global reset pin Active low to enter reset state Suggest to connect with an RC Reset circuit for stability Normally pull high

Note 7: Ditherng function enable control normally pull high
 When DITHB=" 1" ,Disable intenal dithering function
 When DITHB=" 0" ,Enable intenal dithering unction

Note 8: Reserve for LED power input

4 Absolute Maximum Ratings

Driving TFT LCD Panel

Item	Symbol	MIN	MAX	Unit	Remark
------	--------	-----	-----	------	--------

Supply Voltage	V _{CC}	-0.3	6	V	
Operating Temperature	T _{OPR}	-20	70	°C	
Storage Temperature	T _{STG}	-30	80	°C	

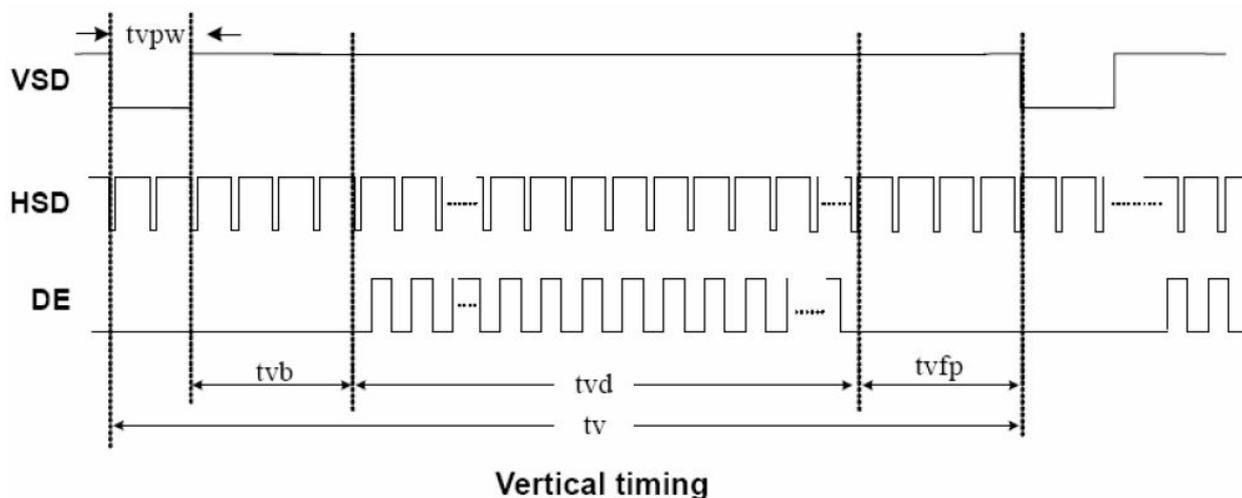
5 Electrical Characteristics

5.1 Driving TFT LCD Panel

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	3.0	3.3	3.6	V
Current of power supply	IVDD	-	4.0	10	mA
Input voltage 'H' level	VIH	0.7VDD	-	VDD	V
Input voltage 'L' level	VIL	0	-	0.3VDD	V

5.2 Interface Timing

Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	Tcph	25			ns	
DCLK frequency	fclk		30	40	MHz	
DCLK pulse duty	Tcwh	40	50	60	%	
VSD setup time	Tvst	8			ns	
VSD hold time	Tvhd	8			ns	
HSD setup time	Thst	8			ns	
HSD hold time	Thhd	8			ns	
Data setup time	Tdsu	8			ns	
Data hold time	Tdhd	8			ns	
DE setup time	Tesu	8			ns	
DE hold time	Tehd	8			ns	
Horizontal display area	thd		800		Tcph	
HSD period time	th		928		Tcph	
HSD pulse width	thpw	1	48		Tcph	
HSD back porch	thb		40		Tcph	
HSD front porch	thfp		40		Tcph	
Vertical display area	tvd		480		th	
VSD period time	tv		525		th	
VSD pulse width	tvpw		3		th	
VSD back porch	tvb		29		th	
VSD front porch	tvfp		13		th	



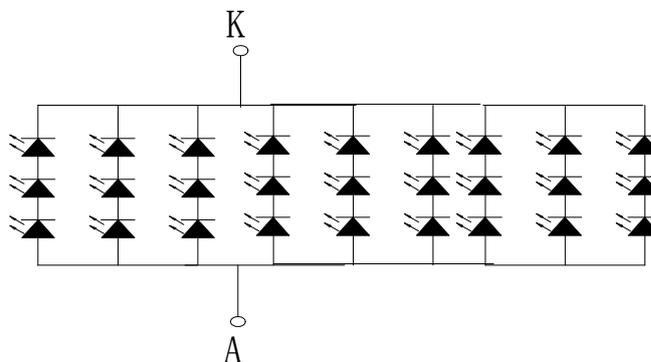
5.3 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F	-	180	-	mA	
Forward Voltage	V_F		9.6		V	
Backlight Power consumption	W_{BL}	-	TBD	-	W	

Note 1: Each LED : $I_F = 20\text{ mA}$, $V_F = 3.2\text{V}$.

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.



Backlight Circuit diagram

Figure : LED connection of backlight

6 Optical Characteristics

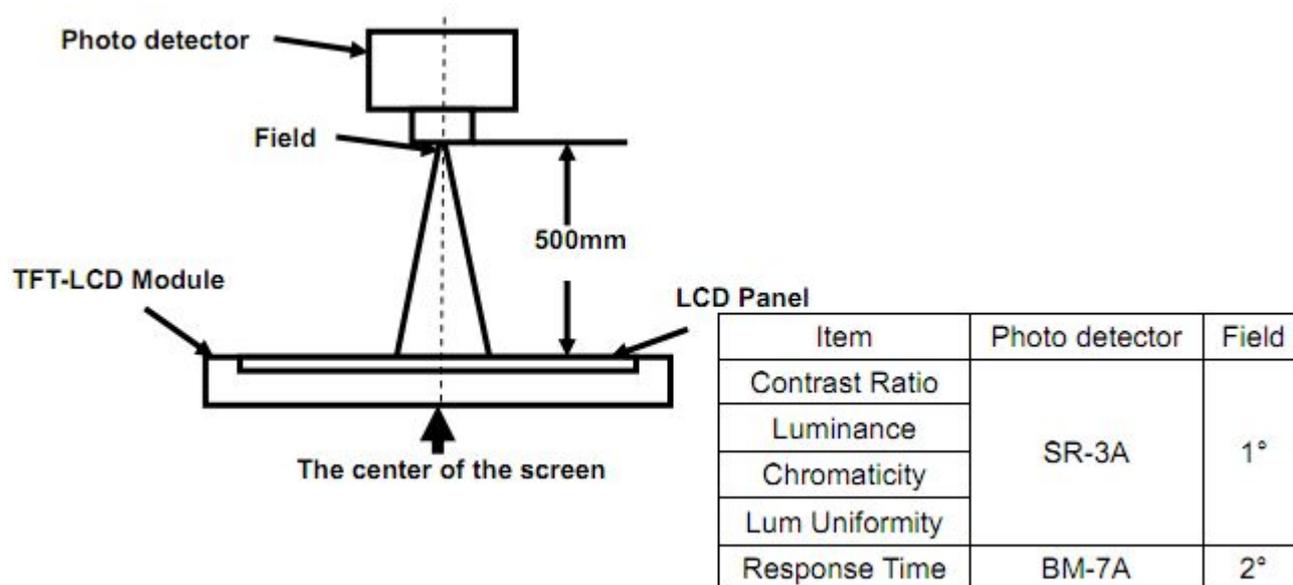
Items	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	
Viewing angles	θ_T	Center CR \geq 10		60	-	Degree.	Note2	
	θ_B			55	-			
	θ_L			50	-			
	θ_R			50	-			
Contrast Ratio	CR	$\Theta = 0$	-	400	500	-	Note1, Note3	
Response Time	T_{ON}	25°C	-	5	7	ms	Note1, Note4	
	T_{OFF}		-	20	28			
Chromaticity	White	Backlight is on	X_W	TBD	TBD	TBD	-	Note1, Note5
			Y_W	TBD	TBD	TBD	-	
	Red		X_R	TBD	TBD	TBD	-	
			Y_R	TBD	TBD	TBD	-	
	Green		X_G	TBD	TBD	TBD	-	
			Y_G	TBD	TBD	TBD	-	
	Blue		X_B	TBD	TBD	TBD	-	
			Y_B	TBD	TBD	TBD	-	
Uniformity	U		-	70	-	%	Note1, Note6	
Luminance	L		300	350			Note1, Note7	

Test Conditions:

1. IF= 20mA(one channel),the ambient temperature is 25.
2. The test systems refer to Note 1 and Note 2.

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.



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).

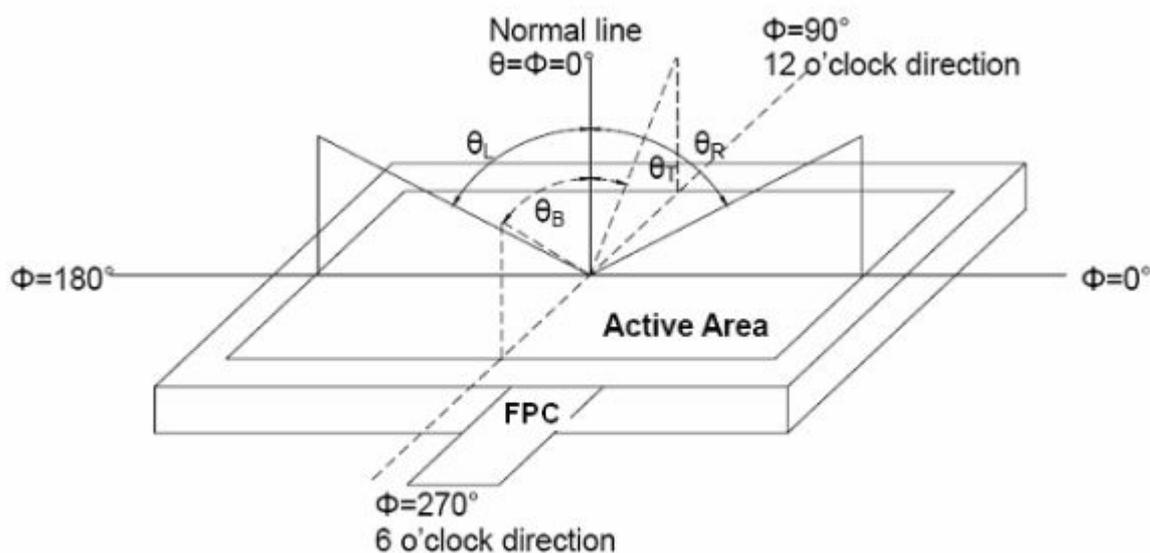


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

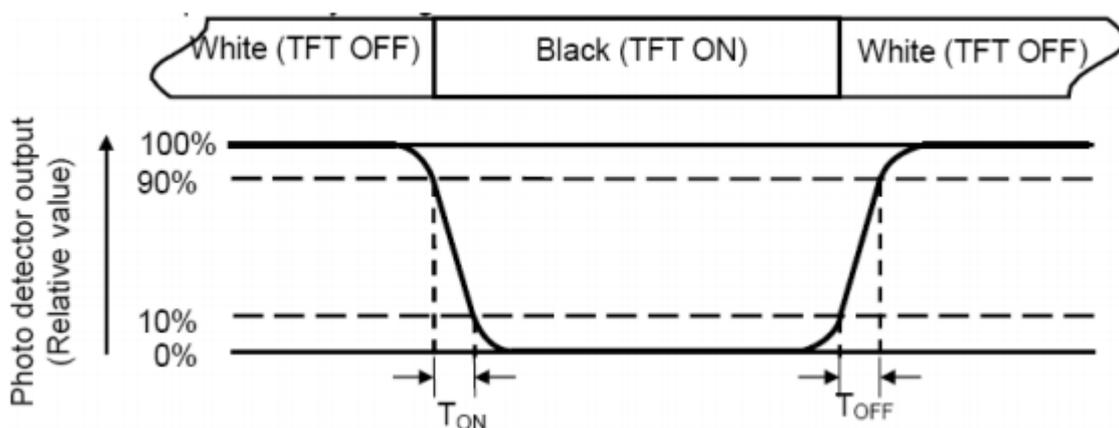
“White state “:The state is that the LCD should driven by Vwhite.

“Black state”: The state is that the LCD should driven by Vblack.

Vwhite: To be determined Vblack: To be determined.

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

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity}(U) = L_{\min} / L_{\max} \times 100\%$$

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

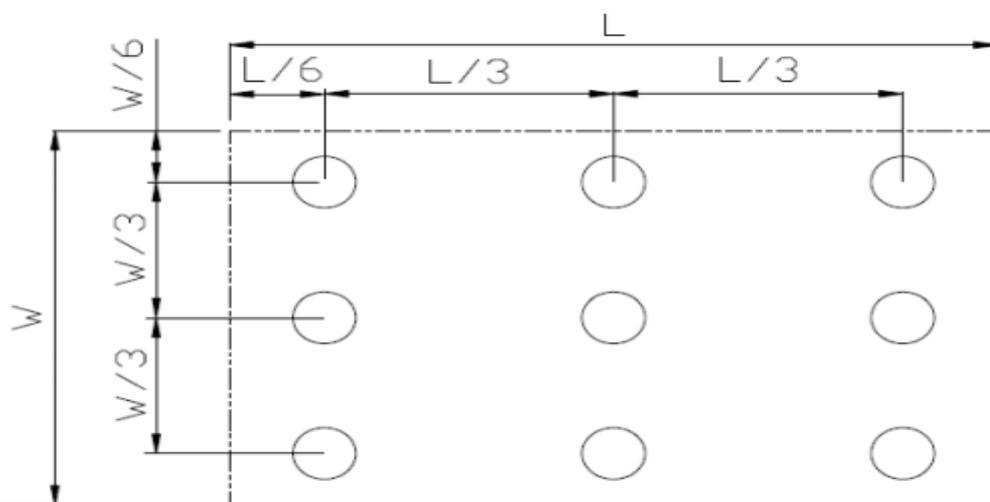


Fig. 2 Definition of uniformity

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

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

Note 7: Definition of Luminance :

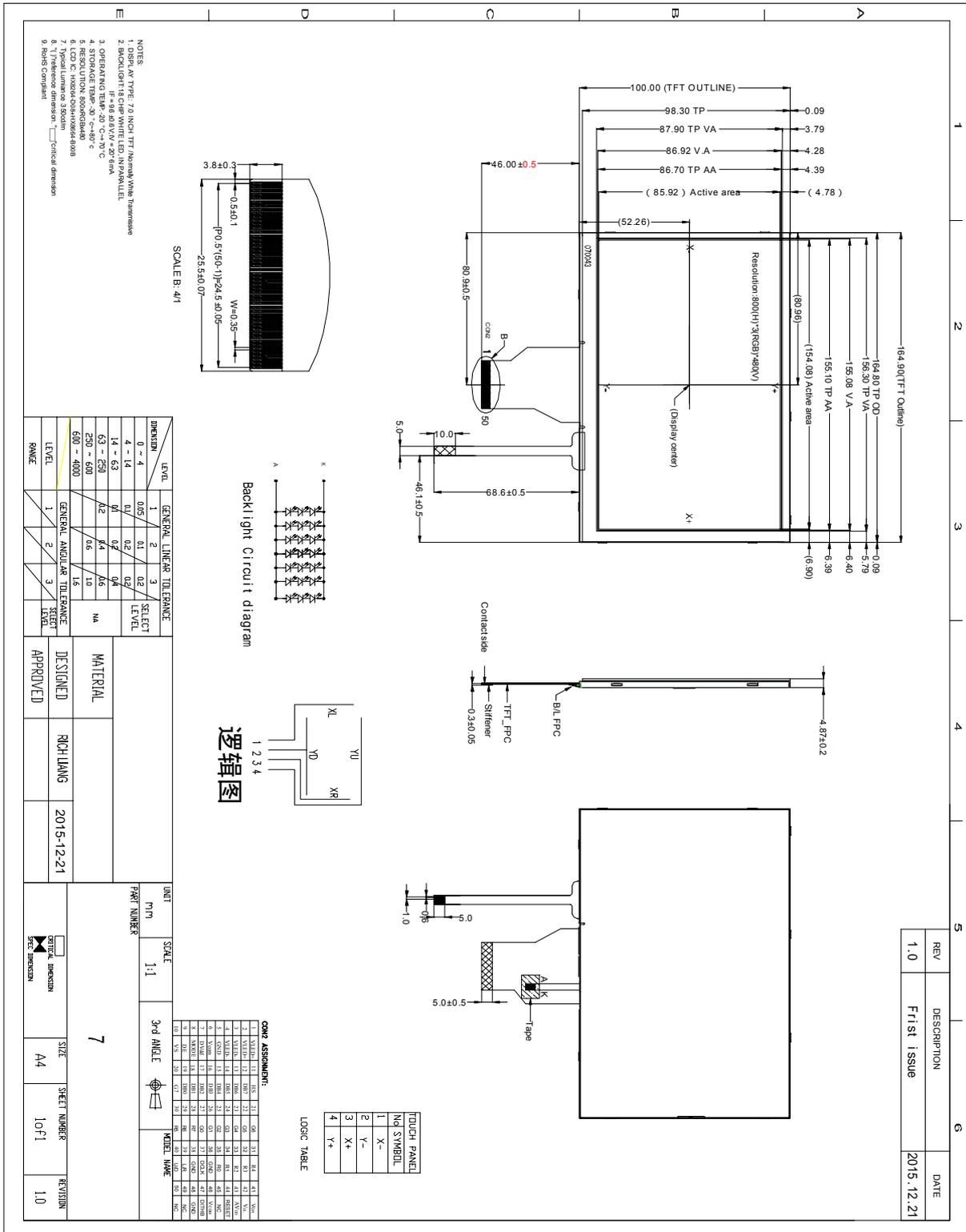
Measure the luminance of white state at center point.

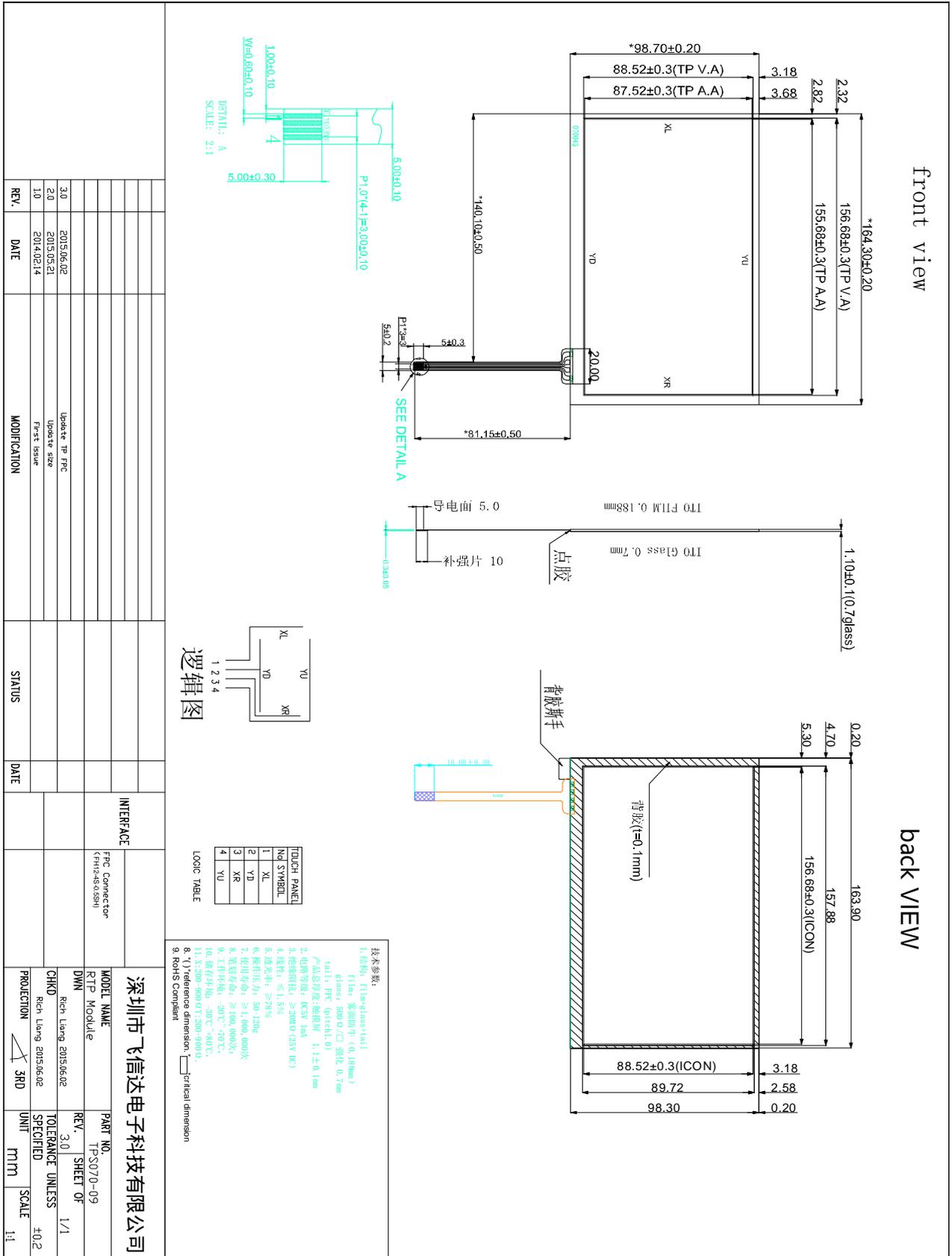
7 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Opeartion	Ts= +70°C, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Opeartion	Ta= -20°C, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80°C, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30°C, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60°C, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30°C 30 min ~ +80°C 30 min Change time: 5min, 30 Cycle	Start with cold temperature,end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Opeartion)	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 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T_S is the temperature of panel's surface.
2. Ta is the ambient temperature of sample.

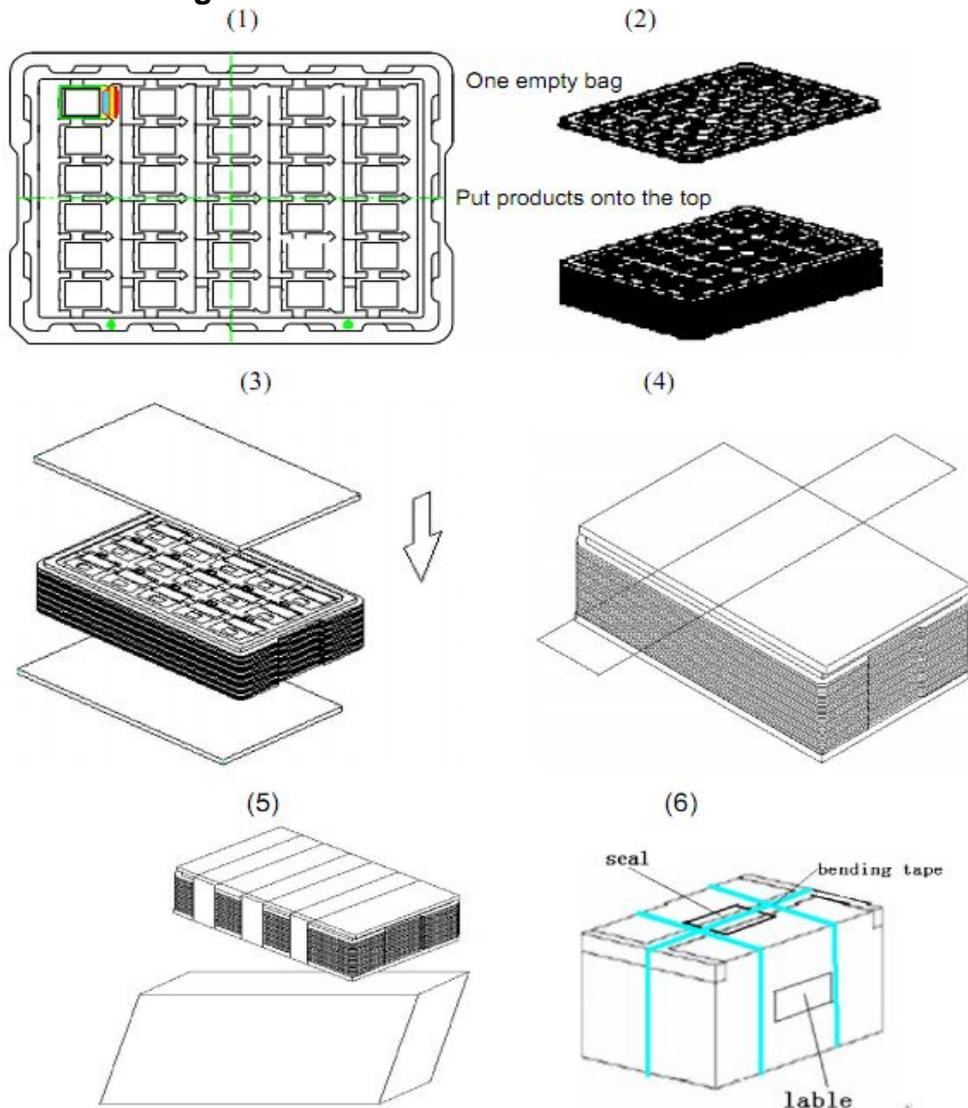
8 Mechanical Drawing





9 Packing

Packing Method



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. 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
- Ketone
- 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°C ~ 40°C 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.