SPECIFICATION

Customer Part Number: A0700WXF2MAAADB01
Product Description: 7'TFT with CTP TFT-LCD Module

[ ] Target Specification
[◉] Preliminary Specification
[ ] Final Specification

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REVISION HISTORY

Revision	Date	Page	Revision Items	Remark
1.0	2022/05/16	-	First Release	
1.1	2022/05/19	P15	CTP Characteristics Updated	
1.2	2022/05/24	P1&P23	General Specification Updated	

CONTENTS

1. Summary

This is a 7 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module with normal-black technology. It is composed of a TFT-LCD panel, LCD Driver IC with T-con integrated, LED backlight unit and CTP with Optical bonding. This product is designed for automotive and other high reliability electronic products and complies with *RoHS* directive.

2. General Specification

Items	Specification	Remark
Diagonal Size	7 inch	--
Resolution	1280(RGB) x 768	--
Active Area(mm)	152.45 x91.47	--
Pixel Pitch (mm)	0.1191 x 0.1191	--
Pixel Configuration	R.G.B. Stripe	--
Technology Type	a-Si	--
Display Mode	SFT (Normally Black)	--
Landscape or Portrait	Landscape	--
Surface Treatment	AG+AF(Top of CTP)	--
Interface	LVDS	--
Color Depth	16.7M	--
Dimension (H x V x D) (mm)	LCM+CTP: 205*136.6*10.18	Note1
	LCM: 168.86*109.6*6.21	Note1
CTP Structure	G+G	--
Driver IC	TFT: RM5365B_3112*1 +RM57451_3110*2	--
	CTP: MXT874U	--
Weight (g)	TBD	Note2

Table 2.1 General TFT Specifications

Note1: The dimensions do not include the length of FPC, screw and component height etc. For detail dimension, please refer to the module outline drawing.
Note2: The weight does not include the weight of protective film.

3. Input / Output Terminals

3.1 CN1 Pin assignment (LCD Interface)

Mating connector type: FH52-40S-0.5SH

PIN #	Symbol	P/I/O	Description	Remark
1	A1	P	LED A1	--
2	A2	P	LED A1	--
3	A3	P	LED A1	--
4	NC	N	Keep this pin open	--
5	K1	P	LED K1	--
6	K2	P	LED K1	--
7	K3	P	LED K1	--
8	NC	N	Keep this pin open	--
9	NTC+	O	Thermistor	--
10	NTC-	O	Thermistor	--
11	NC	N	Keep this pin open, TIANMA Test pin(VDDOTP)	--
12	VCC	P	Power supply 3.3+/-0.1V	--
13	VCC	P	Power supply 3.3+/-0.1V	--
14	GND	P	Ground	--
15	GND	P	Keep this pin Ground(TIANMA Test pin: SCL)	--
16	GND	P	Keep this pin Ground(TIANMA Test pin SDA)	--
17	STBYB	I	Standby mode setting pin. Active low	--
18	LR	I	Horizontally Inverted	Note3
19	UD	I	Vertically Inverted	
20	NC	N	Keep this pin open, TIANMA Test pin(CS)	--
21	GND	P	Ground	--
22	LVDS_RX_IN3+	I	LVDS Data input 3+ (R6-R7,G6-G7,B6-B7)	--
23	LVDS_RX_IN3-	I	LVDS Data input 3- (R6-R7,G6-G7,B6-B7)	--
24	GND	P	Ground	--
25	LVDS_CLK_IN+	I	Positive LVDS CLK input	--
26	LVDS_CLK_IN-	I	Negative LVDS CLK input	--
27	GND	P	Ground	--
28	LVDS_RX_IN2+	I	LVDS Data input 2+ (B2-B5,HS,VS,DE)	--
29	LVDS_RX_IN2-	I	LVDS Data input 2- (B2-B5,HS,VS,DE)	--
30	GND	P	Ground	--
31	LVDS_RX_IN1+	I	LVDS Data input 1+ (G1-G5,B0-B1)	--

PIN #	Symbol	P/I/O	Description	Remark
32	LVDS_RX_IN1-	I	LVDS Data input 1- (G1-G5,B0-B1)	--
33	GND	P	Ground	--
34	LVDS_RX_IN0+	I	LVDS Data input 0+ (R0-R5,G0)	--
35	LVDS_RX_IN0-	I	LVDS Data input 0- (R0-R5,G0)	--
36	GND	P	Ground	--
37	RST	I	Reset pin.	--
38	GND	P	Ground	--
39	NC	N	Keep this pin OPEN	--
40	GND	P	Ground	--

Table 3.1.1 Pin Assignment for LCD Interface

Note1: I/O definition: I---Input, O---Output, P---Power/Ground, N---No connection.
Note2: All of the GND pins should be connected to the system ground.
Note3: Description of scan direction

UD	LR	Description
L	L	Case1
	H	Case2
H	L	Case3
	H	Case4

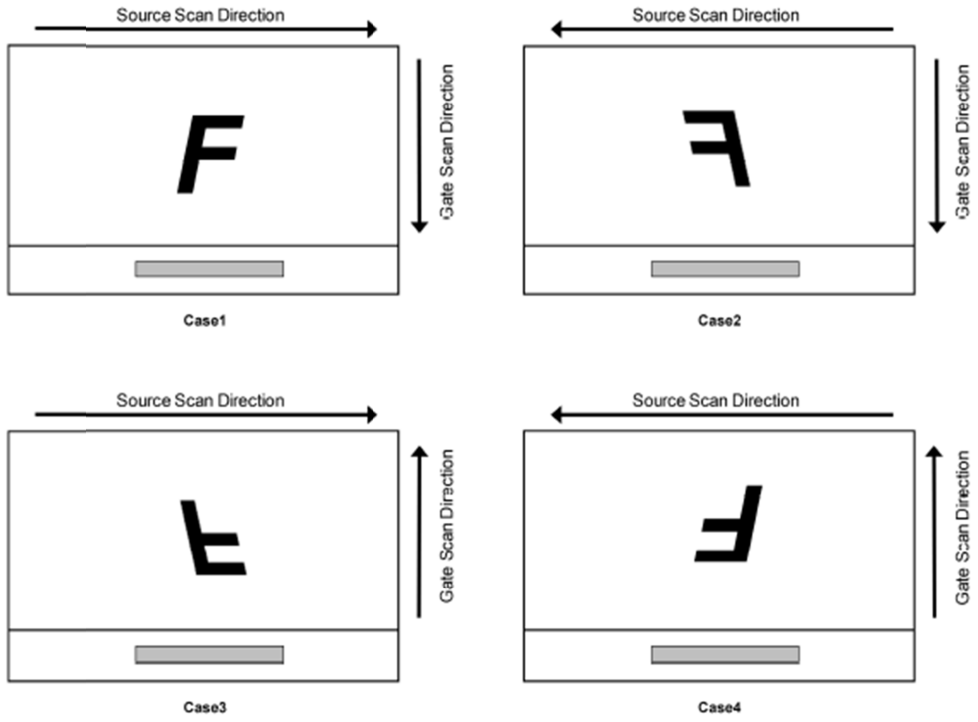


Figure3.1.1 Description of Scan Direction

3.2 CN2 Pin assignment (CTP Interface)

Mating connector type: FH28-10S-0.5SH

PIN #	Symbol	P/I/O	Description	Remark
1	SCL	I	I2C serial clock, 3.3V	
2	SDA	I/O	I2C data input and output, 3.3V	
3	GND	P	Ground	
4	GND	P	Ground	
5	INT	O	External interrupt to the host	
6	GND	P	Ground	
7	RESET	I	CTP System reset signal input, 3.3V	
8	VDD	P	CTP Power supply, 3.3V	
9	GND	P	Ground	
10	GND	P	Ground	

I---Input, O---Output, P--- Power/Ground

4. Absolute Maximum Ratings

GND=0V

Item	Symbol	Min	Max	Unit	Remark
Logic supply voltage	VCC	-0.3	5.0	V	
Operating Temperature	Top	-30	+85	℃	Note1/2
Storage Temperature	Tst	-40	+95	℃	
Digital I/O input signals:	VI/O	-0.3	VCC+0.3	V	Note3

Table 4.1 Absolute Maximum Rating

Note1: The temperature is the ambient temperature of module.
Note2: It is necessary to limit the relative humidity to the specified temperature range.
Condensation on the module is not allowed.
Note3: Input Voltage I/O pin include LR, UD, RST, STBYB.

5. Electrical Characteristics

5.1 DC Characteristics for Panel Driving

(VCC=3.2 to 3.4V, VSS1=VSS2=VSSA=0V, Top = 25℃)

Item	Symbol	Min	Typ	Max	Unit	Remark
Main and I/O Power Supply	VCC	3.2	3.3	3.4	V	
VCC Current	IVCC		270	405	mA	Note5
Low level input voltage	Vil	0	-	0.3*VCC	V	Note1
High level input voltage	Vih	0.7*VCC	-	VCC	V	Note2
Low level output voltage	Vol	0	-	0.4	V	
High level output voltage	Voh	VCC-0.4	-	TBD	V	
Differential input low common mode voltage	Rxvcm	1	1.2	1.4	V	
Differential input voltage	| Vid |	0.1	-	(1.5-Rxvcm)*2	V	
Differential input high threshold voltage	Vth	0.1				Note3
Differential input low threshold voltage	Vtl			-0.1		
LVDS input voltage	Vinlv	0.5	-	1.5		
Pull High/Low Resistor	Ri	-	100	-	Kohm	
Inrush current	Irush	-	-	0.5	A	Note4
LCD Power Consumption	P_{VCC}	-	0.891	1.336	W	Note5

(VCC=3.3V, GND=0V, Top = 25℃)

Table 5.1 Operating Voltages

Note1: I/O powers are include LR, UD, RST, STBYB;

Note2: Differential input low common mode voltage

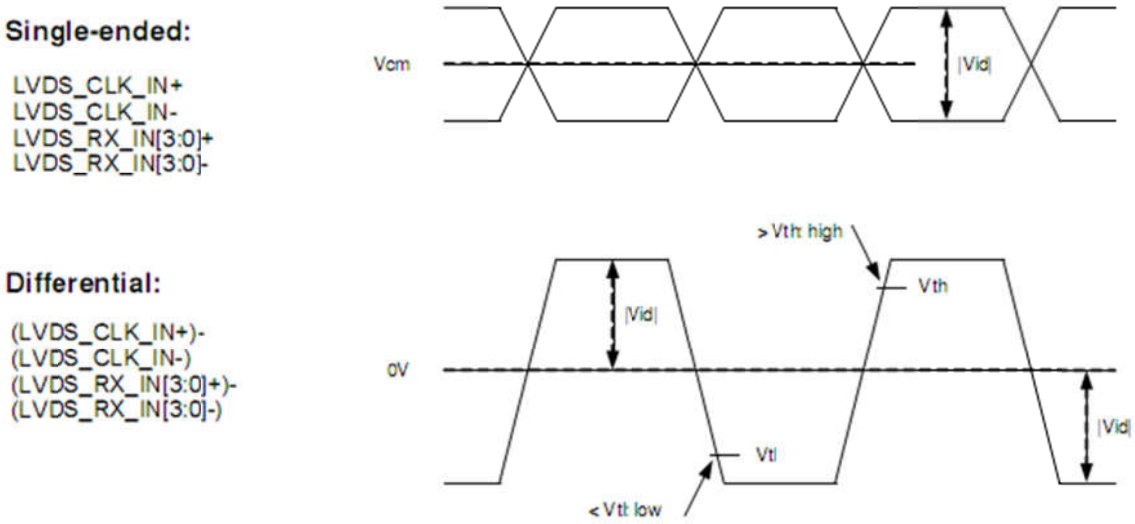


Figure5.1 LVDS Interface Waveform

Note4: Inrush current should be tested under VCC rising time 470us

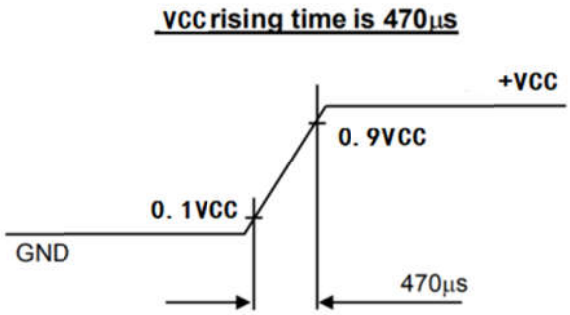


Figure5.3 VCC rising timing

Note5: VDD current and LCD power consumption data are tested under VCC=3.3V, white pattern condition. LCD power consumption does not include the backlight power consumption.

5.2 DC Characteristics for Backlight Driving

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I_F	-	80	90	mA	Each String.Note1
		-	240	270	mA	Totally 3 strings. Note1
Forward Voltage	V_{BL}	-	21.7	23.1	V	Note2
Backlight Power Consumption	W_{BL}	-	5.208	-	W	Note2
Lifetime	-	-	50,000	-	Hrs	Note3

Table 5.2.1 LED Backlight Characteristics

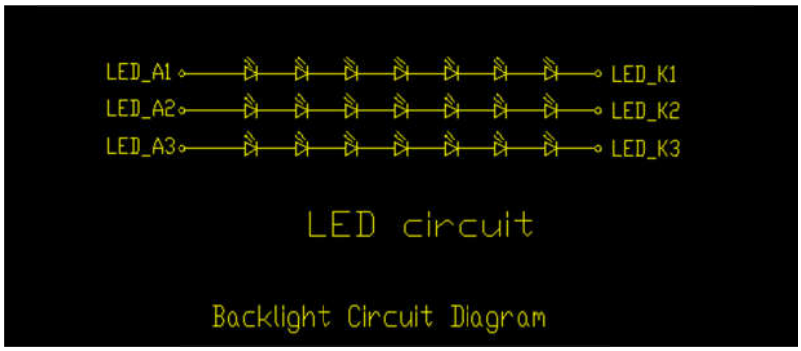


Figure 5.2.2 LED Connection of Backlight

Note1: I_F is defined for one channel LEDs. There are 7 LEDs in the each backlight unit, totally 21pcs LEDs. While the LCM is operating, a stable forward current should be supplied. The forward current max value is only for inrush current.

Note2: I_F =80mA.

Note3: Optical performance should be evaluated at Ta=25℃ only. Operating lifetime means the brightness will decrease to 50% of the original brightness.

Note4: An NTC thermistor is included in the LED circuit. It is used to measure the LED temperature and it located in the LED circuit on the backlight.

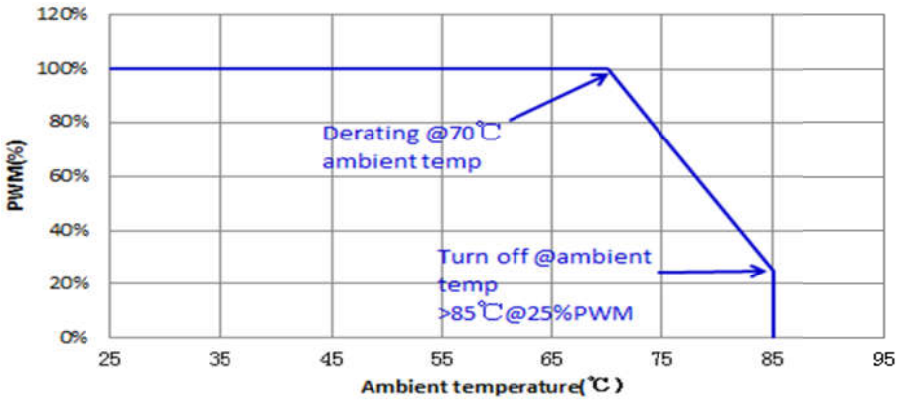


Figure 5.2.4 PWM vs. Ambient Temperature

Note5: To reduce the influence of NTC self-heating and improve the measurement accuracy, suggest the operating current of NTC is 0.01mA.

5.3 Recommended Power ON/OFF Sequence

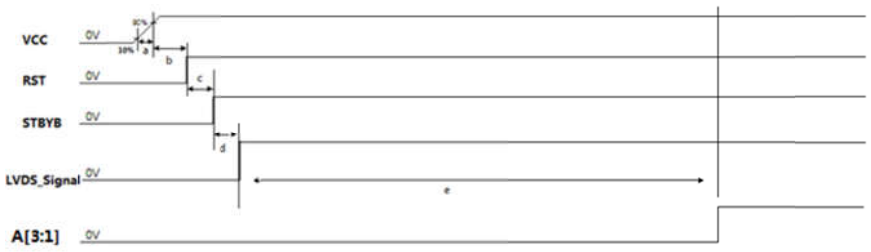


Figure 4.2 Power ON/OFF Sequence

Parameter	Min	Typ	Max	Unit
Ta	1	-	20	ms
Tb	1	-	-	ms
Tc	1	-	-	ms
Td	0	-	-	ms
Te	300	-	-	ms

Table 4.3 Power ON/OFF Sequence

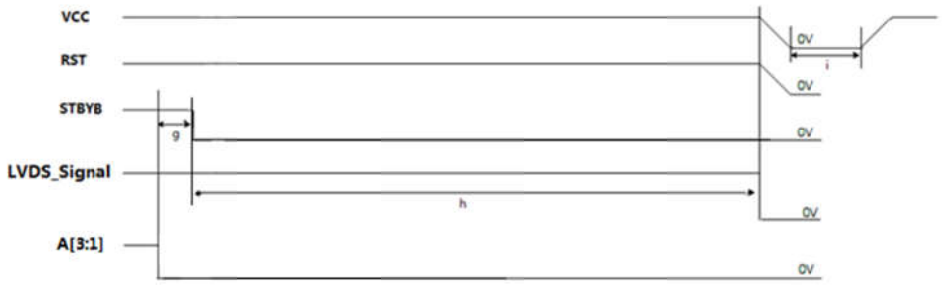


Figure 4.4 Power Off Sequence

Parameter	Min	Typ	Max	Unit
Tg	20	-	-	ms
Th	200	-	-	ms
Ti	1	-	-	s

Table 4.4 Power Off Sequence

Note1: The low level of these signals and analog powers are GND level.
Note2: All of the power and signals should be kept at GND level before power on. If there are residual voltages on
them, the LCD might not work properly.
Note3 A[3:1] is the voltage applied to backlight. Keep it turned off until the display has stabilized.

5.4 Reset timing

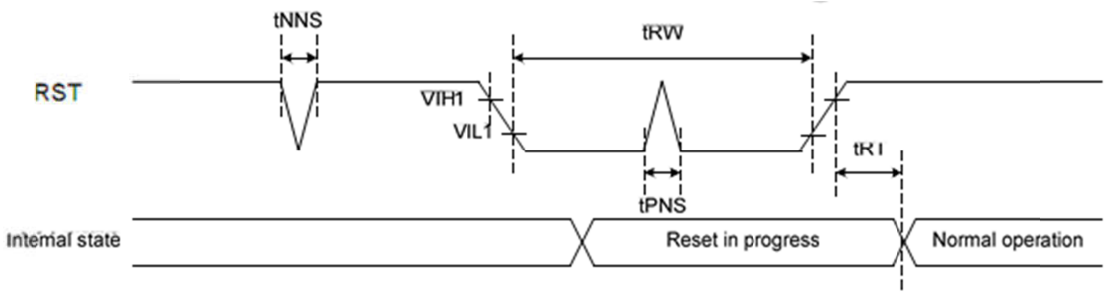


Figure 5.3 Reset Timing

Signal	Parameter	Symbol	Min	Typ	Max	Unit	Remark
RST (RG)	Reset pulse width	tRW	150	-	-	us	
	Reset complete time	tRT	-	-	150	us	
	Positive spike noise width	tPNS	-	-	40	us	
	Negative spike noise width	tNNS	-	-	40	us	

5.5 LCD Module Block Diagram

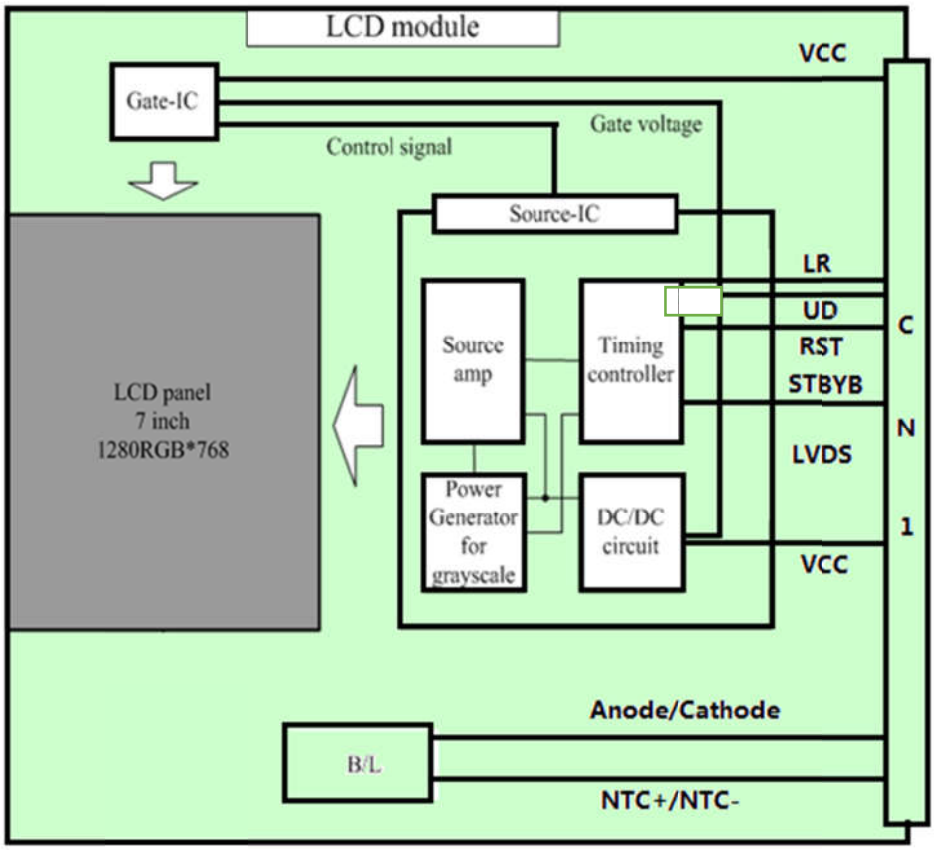


Figure 5.5 LCD Module Block Diagram

6. TFT Interface Timing Characteristics

6.1 RGB Timing at DE mode

LVDS Interface Timing Characteristics

Parameter	Symbol	Unit	Min.	Typ.	Max.	Remarks
DClock Frequency	F_{DCLK}	MHz	62.23	62.58	79.12	
Horizontal valid data	T_{HD}	DCLK		1280		
1 horizontal line	T_h	DCLK	1340	1344	1470	
Vertical valid data	T_{VD}	H		768		
1 vertical field	T_v	H	774	776	897	
Frame Rate	FR	Hz		60		

Table 6.1 Input Timing

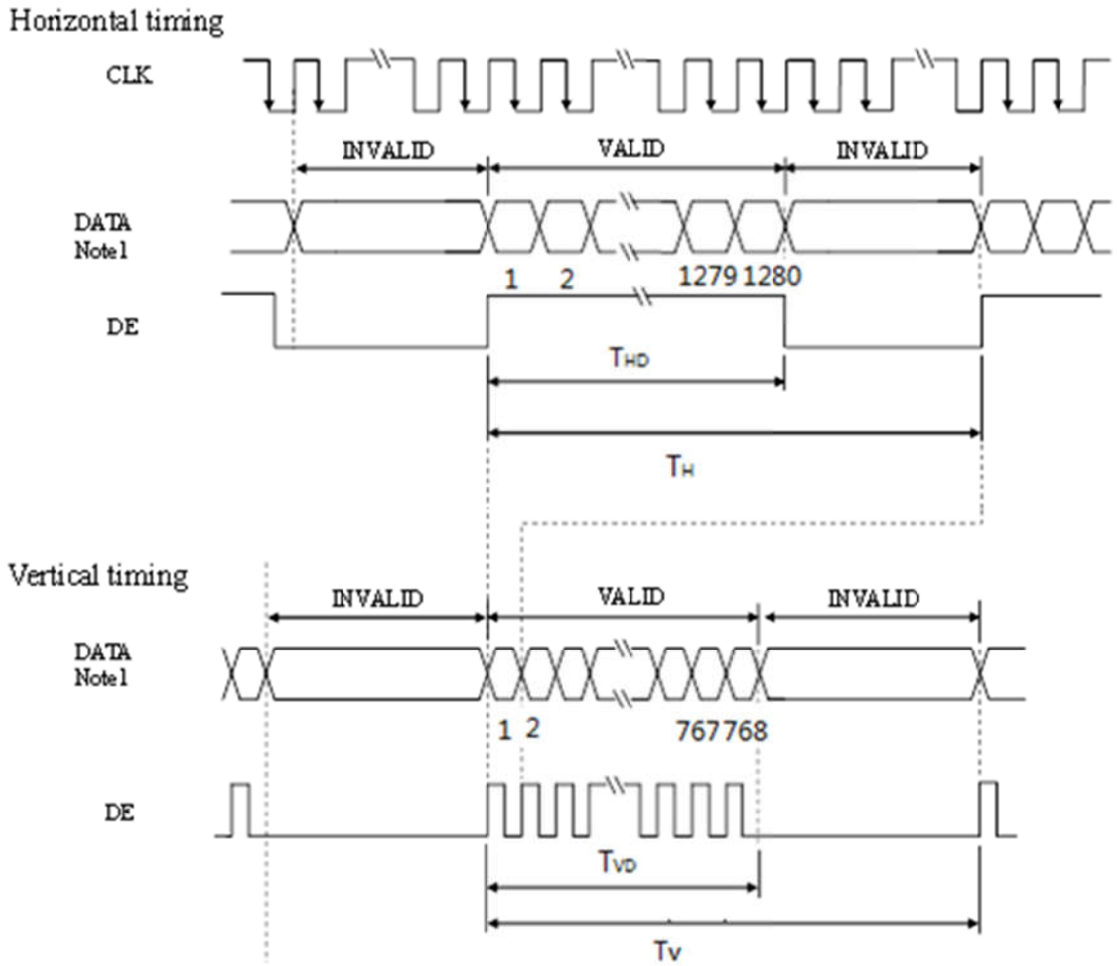


Figure 6.1 Input Timing

6.2 RGB Timing at DE mode

6.2.1 LVDS data mapping

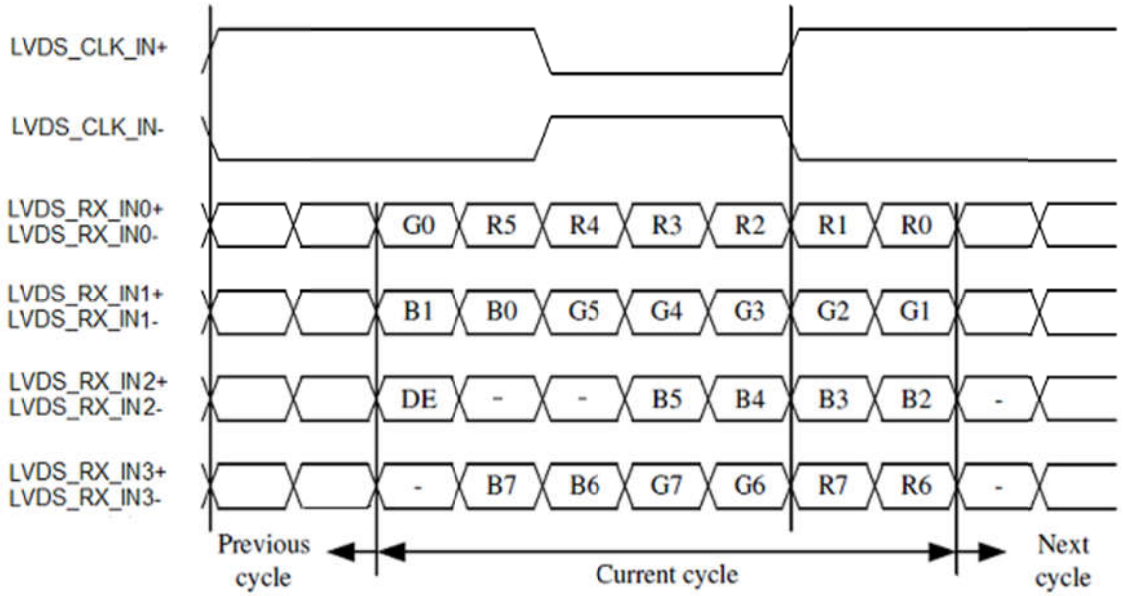


Figure 6.2.1 LVDS 8-bit, VESA Format

6.2.2 LVDS input timing

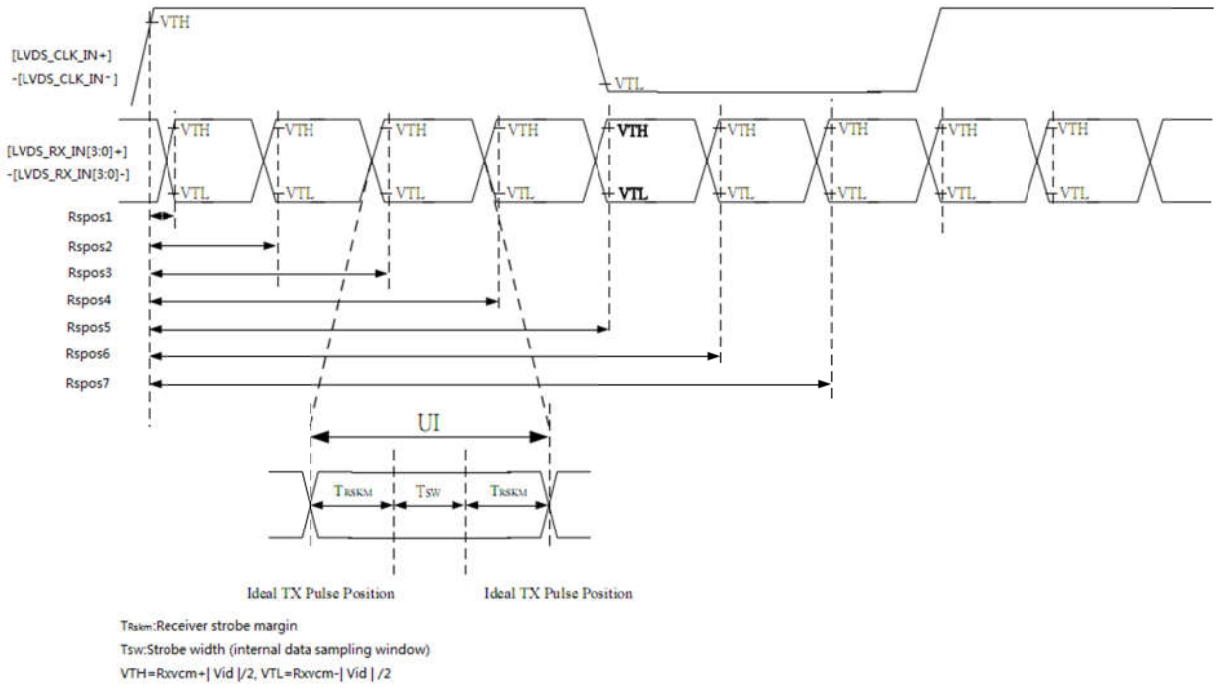


Figure 6.2.2 LVDS Input Timing

Parameter	Symbol	Min.	Typ.	Max.	Unit
Clock Frequency	R_{XFCLK}	10	-	110	MHz
1 data bit time	UI	-	1/7	-	1/ R_{XFCLK}
Position 1	Rspos1	-0.2	0	0.2	UI
Position 2	Rspos2	0.8	1	1.2	UI
Position 3	Rspos3	1.8	2	2.2	UI
Position 4	Rspos4	2.8	3	3.2	UI
Position 5	Rspos5	3.8	4	4.2	UI
Position 6	Rspos6	4.8	5	5.2	UI
Position 7	Rspos7	5.8	6	6.2	UI
Input data skew margin	T_{RSKM}	-	-	0.2	UI
Clock high time	T_{LVCH}	-	4/(7* R_{XFCLK})	-	ns
Clock low time	T_{LVCL}	-	3/(7* R_{XFCLK})	-	ns
Input eye width	TEYEW	0.6			UI
Input eye border	TEX			0.2	UI

Table 6.2.2 LVDS Input Timing Parameters

7. Capacitive Touch Panel

7.1 Touch Panel Module Characteristics

Item	Description	Note
Driver IC	MXT874U	
Touch Method	Finger	
Number of simultaneous touches	5 points	
Interface	I2C	
CTP Structure	G+G	
Slave Address	0x4A	
Touch Accuracy	Border:±2.0mm/Center:±1.5mm	Note1
Touch Linearity	Border:±2.0mm/Center:±1.5mm	Note2
Jitter	Border:±2.0mm/Center:±1.5mm	Note3
Distance of separated fingers	Oblique Line:18mm Straight Line:16mm	Note4

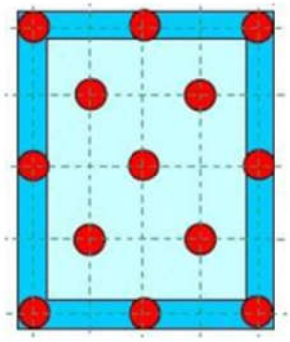
Note1: Touch the 13 circular areas with grounded standard copper columns with reference to the area shown in the figure below. Touch for more than 10 times, and 250ms each time. Record the coordinates reported by TP and calculate the maximum distance away from the theoretical value

(1) Calculate the distance of the coordinates (Xa, Ya) to the target coordinates (Xr, Yr)

$$D\ Accuracy = \sqrt{(X_a - X_r)^2 + (Y_a - Y_r)^2}$$

(2) The maximum distance is taken as the accuracy error of the point K

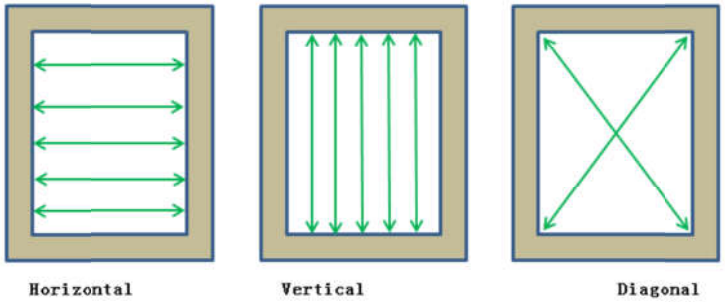
Point K accuracy =max (D1, D2 … D10)



Note2: Touch the 13 circular areas with grounded copper columns with reference to the area shown in the figure below. Touch for more than 10 times, and 250ms each time. Record the coordinates reported by TP and calculate the maximum distance away from the theoretical value.

Linearitycenter= max(Linearity5,Linearity6,Linearity7,Linearity8)

Linearityedge= max(Linearity1,Linearity2,Linearity3,Linearity4)

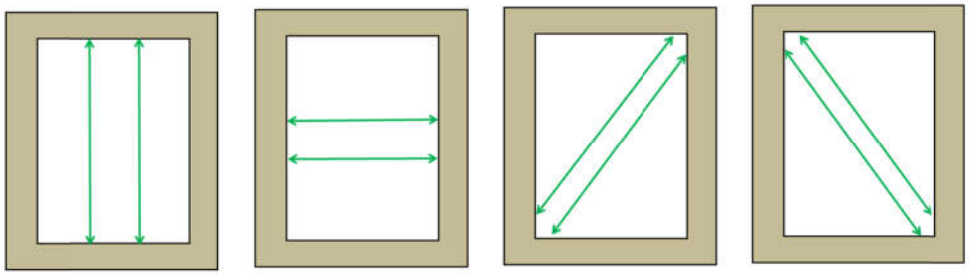


Note3: Referring to the illustrated area as Note 1, the 13 circular areas are touched with a grounded copper column, tested once and when collected in 5000ms, record the coordinates reported by TP. The maximum offset distance between the 13 points was calculated using the following formula.

Distance Error= $\sqrt{(X_i - X_j)^2 + (Y_i - Y_j)^2}$

Jitter=max(Error1,Error2…)

Note4: Grounded copper column, test speed of 10 mm/s. The minimum distance at which the two copper columns can be separated is recorded.



7.2 CTP Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit	Remark
Operating Temperature	TOP	-30	--	+85	℃	
Storage Temperature	TST	-40		+95	℃	
Input voltage range	VDD	-0.3	--	+3.6	V	
Static Electricity	Be sure that you are grounded when handing TP					

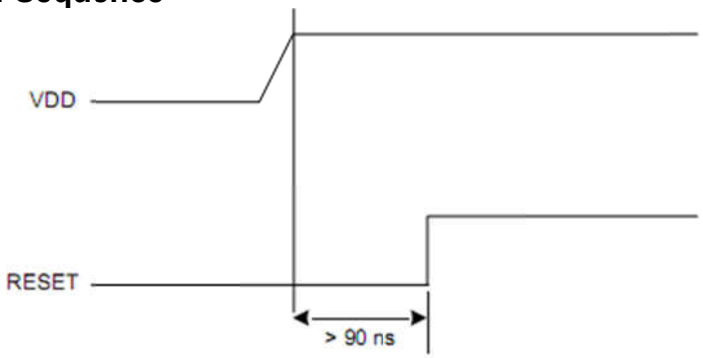
Note1: If the module exceeds the absolute maximum ratings, it may be damaged permanently. Also, if the module operated with the absolute maximum ratings for a long time, it is reliability may drop.

7.3 CTP Electrical Characteristics

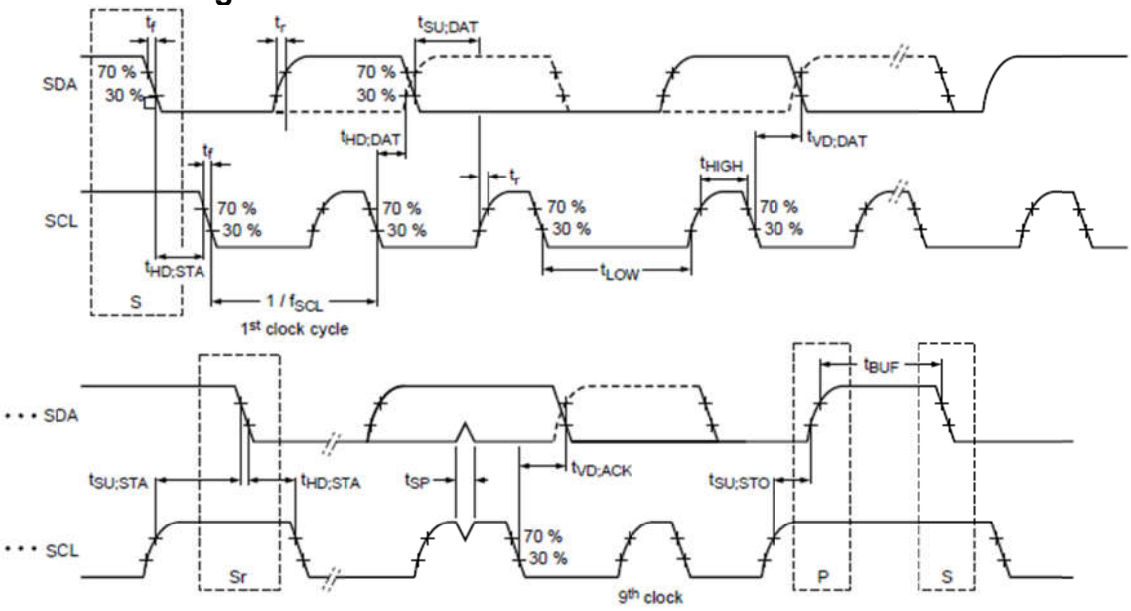
Item		Symbol	Test Condition	MIN	TYP	MAX	Unit	Remark
Power Supply		VDD	-	3.2	3.3	3.4	V	
Operation current		IOP	-	-	30	40	mA	
Input Signal Voltage	High Level	VIH	-	0.7*VDD	--	VDD	V	
	Low Level	VIL	-	-0.3	--	0.3*VDD	V	
Output Signal Voltage	High Level	VOH	-	0.8*VDD	--	VDD	V	
	Low Level	VOL	-	0	--	0.2*VDD	V	

7.4 CTP Timing

7.4.1 Power On/Off Sequence



7.4.2 I2C Interface Timing



$V_{IL} = 0.3V_{DD}$
$V_{IH} = 0.7V_{DD}$

Characteristics of the SDA and SCL I/O stages

Symbol	Parameter	Conditions	Standard-mode		Fast-mode		Fast-mode Plus		Unit
			Min	Max	Min	Max	Min	Max	
V_{IL}	LOW-level input voltage		–0.5	$0.3V_{DD}$	–0.5	$0.3V_{DD}$	–0.5	$0.3V_{DD}$	V
V_{IH}	HIGH-level input voltage		$0.7V_{DD}$		$0.7V_{DD}$		$0.7V_{DD}$		V
V_{hys}	hysteresis of Schmitt trigger inputs		-	-	$0.05V_{DD}$	-	$0.05V_{DD}$	-	V
V_{OL1}	LOW-level output voltage 1	(open-drain or open-collector) at 3 mA sink current; $V_{DD} > 2$ V	0	0.4	0	0.4	0	0.4	V
V_{OL2}	LOW-level output voltage 2	(open-drain or open-collector) at 2 mA sink current $V_{DD} \leq 2$ V	-	-	0	$0.2V_{DD}$	0	$0.2V_{DD}$	V
I_{OL}	LOW-level output current	$V_{OL} = 0.4$ V	3	-	3	-	20	-	mA
		$V_{OL} = 0.6$ V	-	-	6	-	-	-	mA
t_{of}	output fall time from V_{IHmin} to V_{ILmax}		-	250	$20 \times (V_{DD} / 5.5\ V)$	250	$20 \times (V_{DD} / 5.5\ V)$	120	ns
t_{SP}	pulse width of spikes that must be suppressed by the input filter		-	-	0	50	0	50	ns
I_i	input current each I/O pin	$0.1V_{DD} < V_i < 0.9V_{DDmax}$	–10	+10	–10	+10	–10	+10	µA
C_i	capacitance for each I/O pin		-	10	-	10	-	10	pF

Characteristics of the SDA and SCL bus lines for Standard, Fast, and Fast-mode Plus I2C-bus devices

Symbol	Parameter	Conditions	Standard-mode		Fast-mode		Fast-mode Plus		Unit
			Min	Max	Min	Max	Min	Max	
f_{SCL}	SCL clock frequency		0	100	0	400	0	1000	kHz
$t_{HD;STA}$	hold time (repeated) START condition	After this period, the first clock pulse is generated.	4.0	-	0.6	-	0.26	-	µs
t_{LOW}	LOW period of the SCL clock		4.7	-	1.3	-	0.5	-	µs
t_{HIGH}	HIGH period of the SCL clock		4.0	-	0.6	-	0.26	-	µs
$t_{SU;STA}$	set-up time for a repeated START condition		4.7	-	0.6	-	0.26	-	µs
$t_{HD;DAT}$	data hold time	CBUS compatible masters	5.0	-	-	-	-	-	µs
		I^2C-bus devices	0		0		0	-	µs
$t_{SU;DAT}$	data set-up time		250	-	100	-	50	-	ns
t_r	rise time of both SDA and SCL signals		-	1000	20	300	-	120	ns
t_f	fall time of both SDA and SCL signals		-	300	20 × (V_{DD} / 5.5 V)	300	20 × (V_{DD} / 5.5 V)	120	ns
$t_{SU;STO}$	set-up time for STOP condition		4.0	-	0.6	-	0.26	-	µs
t_{BUF}	bus free time between a STOP and START condition		4.7	-	1.3	-	0.5	-	µs
C_b	capacitive load for each bus line		-	400	-	400	-	550	pF
$t_{VD;DAT}$	data valid time		-	3.45	-	0.9	-	0.45	µs
$t_{VD;ACK}$	data valid acknowledge time		-	3.45	-	0.9	-	0.45	µs
V_{nL}	noise margin at the LOW level	for each connected device (including hysteresis)	0.1V_{DD}	-	0.1V_{DD}	-	0.1V_{DD}	-	V
V_{nH}	noise margin at the HIGH level	for each connected device (including hysteresis)	0.2V_{DD}	-	0.2V_{DD}	-	0.2V_{DD}	-	V

8. Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle		θU	CR≧10	75	85	--	°	Note 1&2&3
		θD		75	85	--		
		θL		75	85	--		
		θR		75	85	--		
Contrast Ratio		CR	Vertical 0 deg, 25℃	800	1000	--	--	Note 1&2&3
Response Time		Tr+Tf	25℃	--	25	35	ms	Note 1&4
Chromaticity	White	X	CIE1931-XYZ	0.260	0.310	0.360	--	Note 1&5
		Y		0.303	0.353	0.403		
	Red	X		0.584	0.634	0.684		
		Y		0.277	0.327	0.377		
	Green	X		0.256	0.306	0.356		
		Y		0.576	0.626	0.676		
	Blue	X		0.100	0.150	0.200		
		Y		0.020	0.070	0.120		
	NTSC			65	70	--	%	
Luminance		--	--	--	1000	--	Cd/m2	Note 6
Luminance Uniformity		--	--	75	80	--	%	Note 7

Test Conditions:

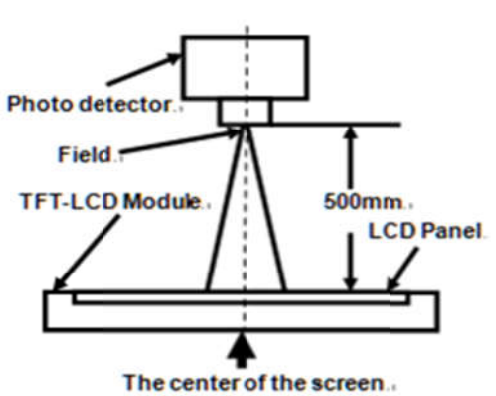
1. I_F= 80mA (Each channel), the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

Note1: Definition of optical measurement system

Measured at the center of the panel by SR-3

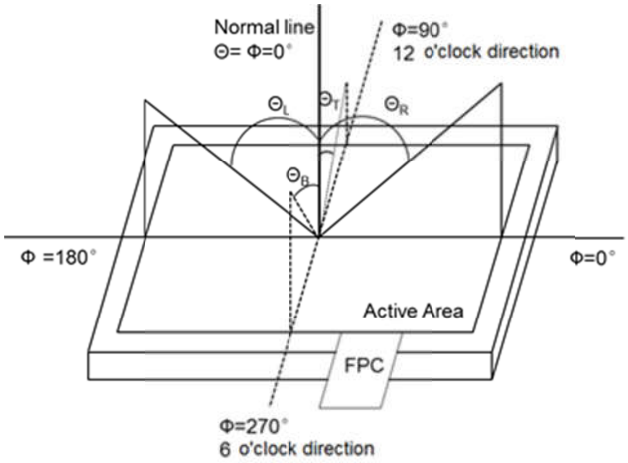
Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: Ta=+25℃.
- Adjust operating voltage to get optimum contrast at the center of the display.
- Measured value at the center point of LCD panel after more than 10 minutes while backlight is turned on



Item	Photo detector	Field	High
Contrast Ratio	SR-3A	1°	H=500mm
Luminance			
Chromaticity			
Luminance Uniformity	SR-3A	1°	H=500mm
Viewing Angle	EZ-Contrast	6mm	H=1mm/H≈80mm
Response Time	LCD 5200	3mm	H=200mm

Note2: Definition of viewing angle range and measurement system



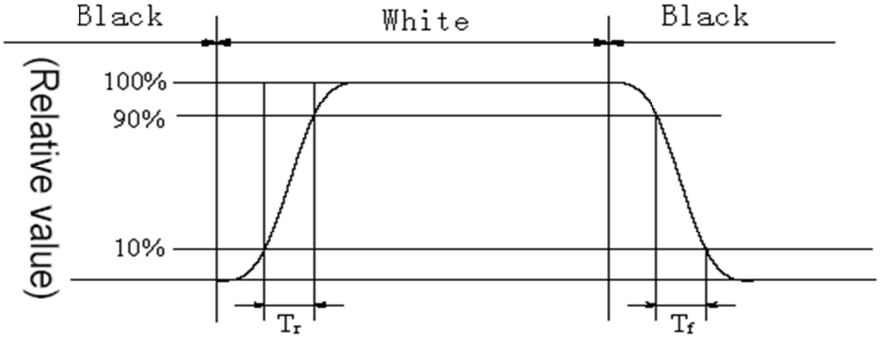
Note3: Definition of contrast ratio:

$$\text{Contrast Ratio(CR)} = \frac{\text{Luminance When LCD is White}}{\text{Luminance When LCD is Black}}$$

Contrast Ratio is measured in the optimum common electrode voltage

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 (T_{ON}) is the time between photo detector output intensity changed from 10% to 90%.
And fall time (T_{OFF}) is the time between photo detector output intensity changed from 90% to 10%.
Please see the illustration below:



Note5: Definition of color chromaticity (CIE1931)
Color coordinates measured at the center point of the LCD.

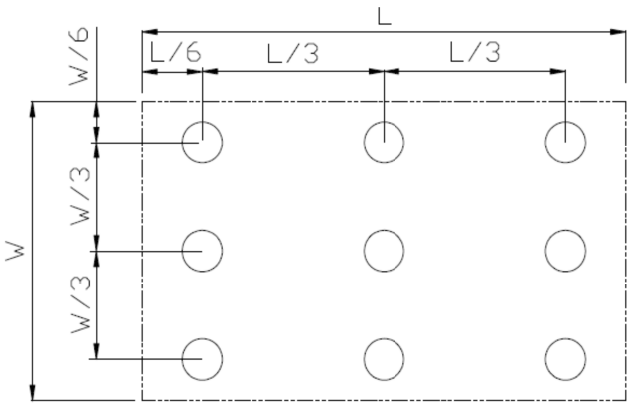
Note6: Definition of Luminance
Measure the luminance at white state at the center point.

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) = Lmin / Lmax

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



9. Reliability Test

Contents of Reliability Test

No	Test Item	Test condition	Criterion
1	High Temperature Storage	90℃, 500hrs Restore 2hrs or more at 25℃	Note1, Note2, Note4, Note5, IEC60068-2-2,GB2423.2
2	Low Temperature Storage	-40℃ 500hrs Restore 2hrs or more at 25℃	Note1, Note2, Note4, IEC60068-2-1,GB2423.1
3	High Temperature Operation	85℃±2℃, 500hrs, Restore 2hrs or more at 25℃	Note1, Note2, Note4, Note5, IEC60068-2-2,GB2423.2
4	Low Temperature Operation	-30℃' 500hrs Restore 2hrs or more at 25℃	Note1, Note2, Note4 IEC60068-2-1,GB2423.1
5	High Temperature & Humidity Operation	60℃±2℃, 90±2%RH 500hrs Restore 2hrs or more at 25℃	Note1, Note2, Note4 IEC60068-2-78,GB/T2423.3
6	Thermal Shock (non-operational)	-30°C→ change→+80°C 30min 5min 30min 200cycle, Restore 2hrs or more at 25℃	Note1, Note2, Note4 Start with cold temperature End with high temperature, IEC60068-2-14,GB2423.22
7	Vibration Test (non-operational)	Acceleration: 5g; Frequency: 30~500HZ; Sweep time: 15 mins ; Test time: 2h in each axis (For X\Y\Z)	Note1, Note2 IEC 60068-2-6
8	Shock Test (non-operational)	100G, 6ms, ±X, ±Y, ±Z, 3times for each direction	Note1, Note2 IEC 60068-2-27
9	ESD (operational)	TFT Module Level: C=150pF±10%, R=330Ω 5 point /panel surface Contact discharge: ±4kV, 5times Air discharge: ±8kV, 5times (Environment:15℃~35℃ , 30%~60%, 86Kpa~106Kpa)	Note1, Note2, Note3 IEC61000-4-2
10	Package Vibration	Frequency range： 5~20-200Hz, PSD:0.01-0.01-0.001 Total:0.781g2/Hz， Time： X/Y/Z 30min for each direction	Note1, Note2 GB/T 4857.23-2012
11	Package Drop Test	Height: 80 cm,1 corner, 3edges, 6 surfaces	Note1, Note2 GB/T 4857.5-1992

Note 1: After completion of the test, the sample shall be free from the following defects:
1) Air bubble in the LCD
2) Seal leak
3) Non-display
4) Missing segments
5) Glass crack
6) Yellowish or reddish appearance and will not be taken into consideration after RA tests
7) Tiny bright dot and dense tiny highlights will not be accepted under ND 2% filter after RA tests

Note 2: Use sample for only one reliability test.

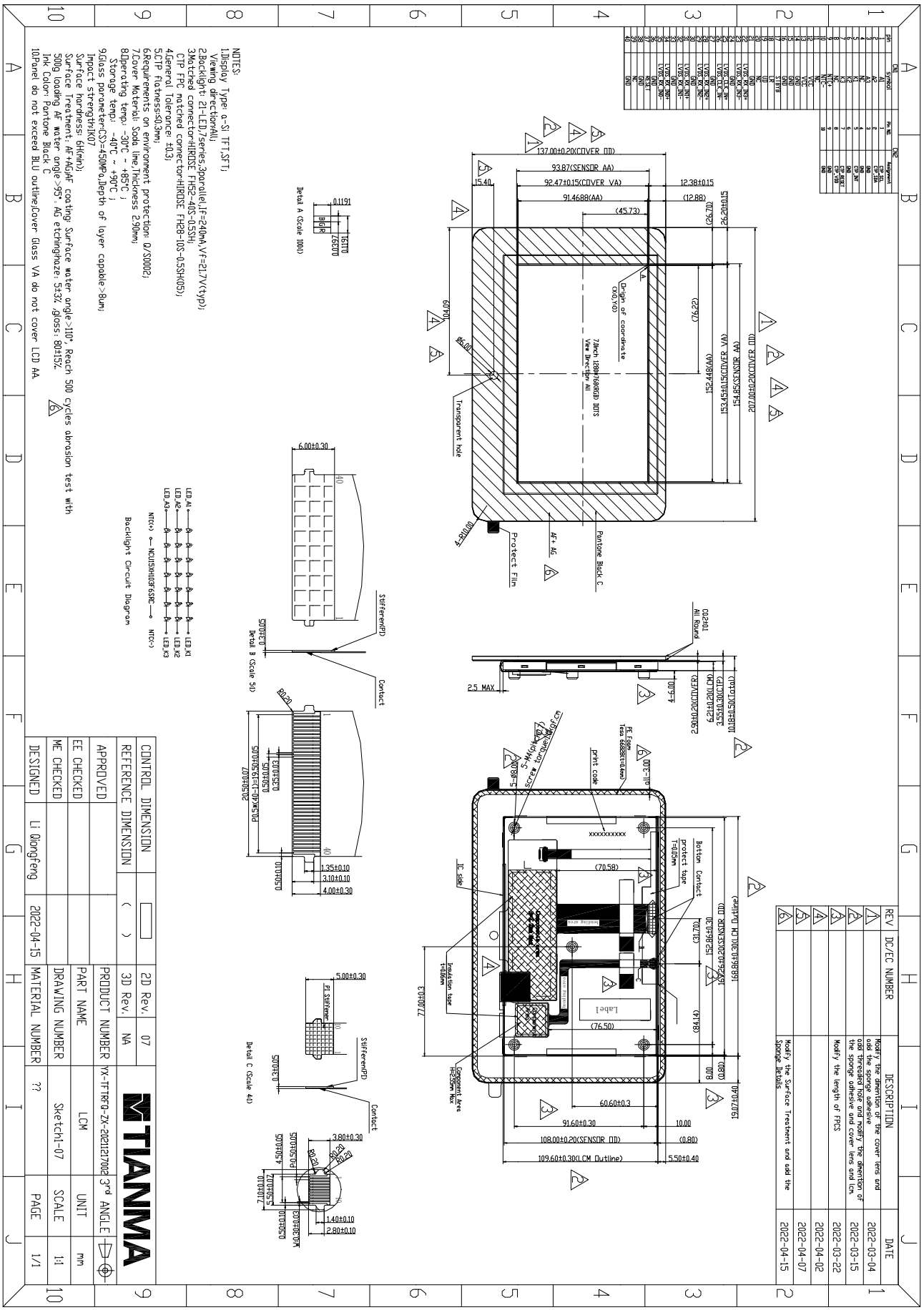
Note 3: In case of an abnormal display caused by discharge, if it can recover to normal state after reset, it is considered “PASS”. The use of an ionizer (antistatic blower) is recommended during this test. When removing the protection film from LCM panel, do it at a slow speed (preferably more than one second) and blow with ionizer toward the peeling face to minimize ESD which may damage the electrical circuit.

Note 4: For duration test in the chamber
a. Keep a small distance between each sample and don’t place the samples close to the wall or the wick. Don’t open the chamber unless absolutely necessary.
b. During the test, avoid moisture condensation on the polarizer.
c. After taking the samples out of the chamber and returning to room temperature and humidity, wait at least two hours before inspecting and measuring data.
d. The temperature is the ambient temperature of sample.

Note 5: Polarizer color minor change (Such as reddish) will consider as pass if the optical test data is within spec.

Note 6: Tianma suggests that EMC/EMI and Bump Test related test to be carried out on customer’s unit and Tianma will assist to improve the performance if required in the final MP..

10. Mechanical Drawing



11. Product Inspection Criteria

11.1 Inspection Conditions

11.1.1 Ambient conditions:

a. Temperature: Room temperature 25±5℃

b. Humidity: (60±10) %RH

c. Illumination:

Display backlight unit on, illumination on the display: 100-300lux

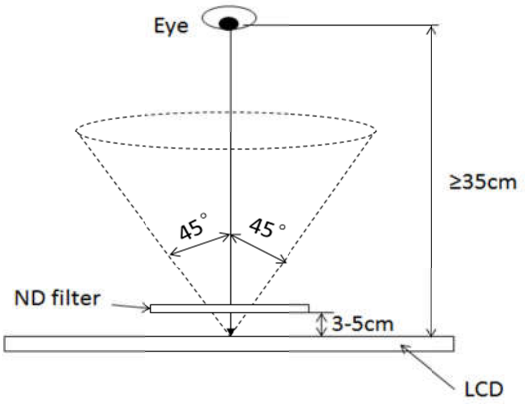
Display backlight unit off, illumination on the display light-off: 800-1200lux

11.1.2 Viewing distance

The distance between the LCD and the inspector's eyes shall be 35cm or more.

11.1.3 Viewing Angle

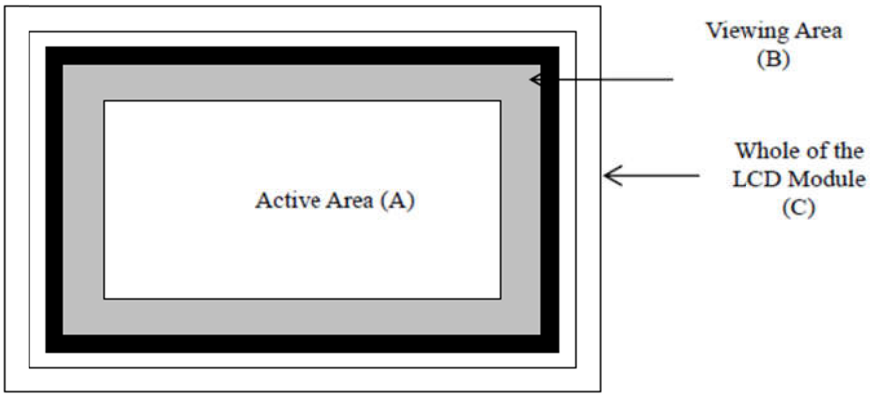
U/D: 45º/45º, L/R: 45º/45º



11.1.4 Light-on condition

The luminance of the module should refer to the recommended value in this specification.

11.1.5 Definition of LCD zone



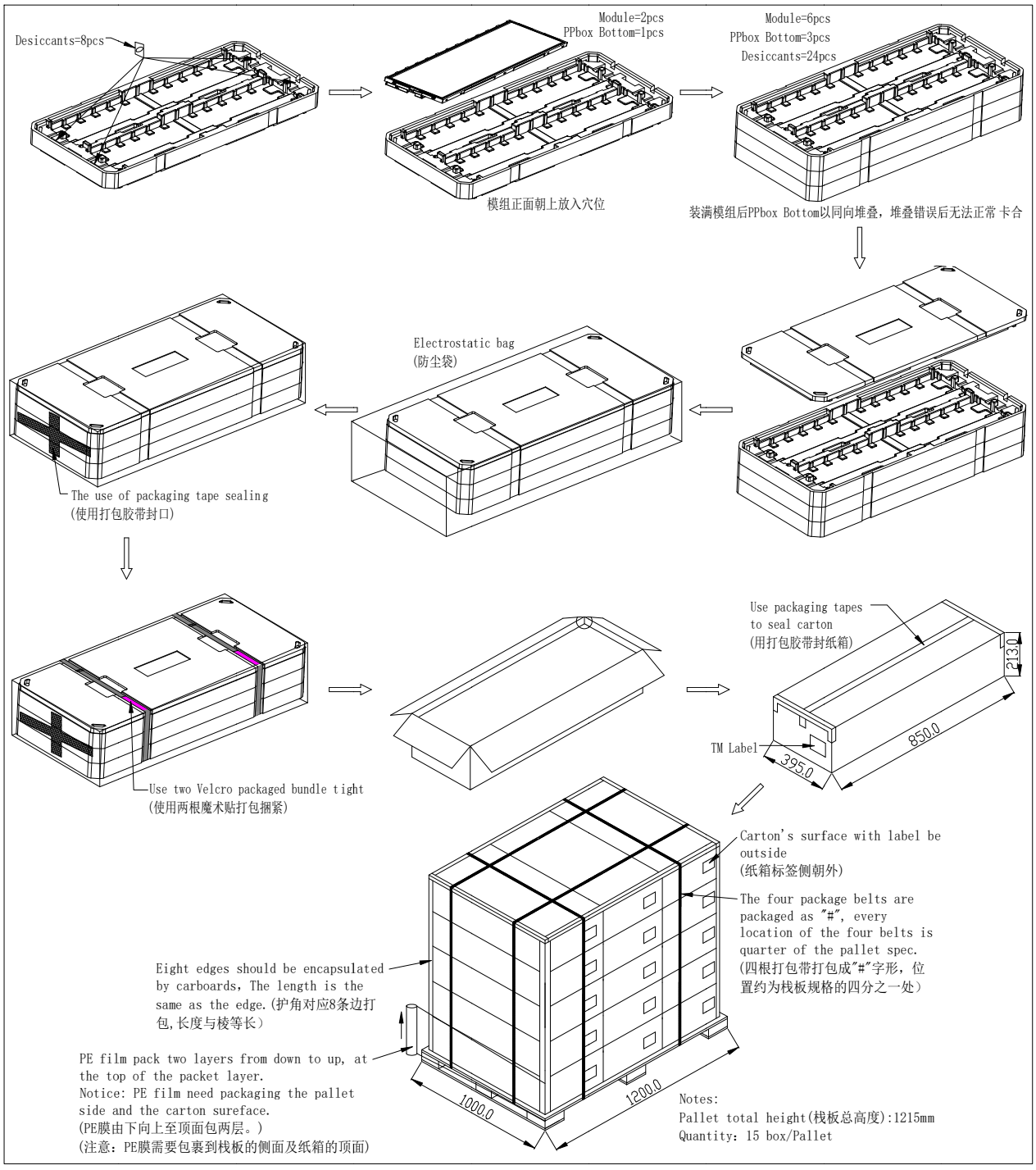
A-zone: The inside of the Active Area(as defined on the product drawing)

B-zone: The inside of the Viewing Area which is between A-zone and the metal frame. (Including CTP Black painting area)

C-zone: Whole of the LCD Module except the zone A and B. (Including FPC& Metal Frame & backside of the LCD Module)

12. Packing Instruction

No	Item	Model (Materiel)	Dimensions(mm)	Weight(Kg)	Quantity	Rem
1	CTP	TBD				
2	Tray	TBD				
3	EPE	TBD				
4	EPE	TBD				
5	EPE	TBD				
6	Carton	TBD				
7	ESD bag	TBD				
8	Total Weight	TBD				



13. Precautions for Use of LCD Module

13.1 Handling Precautions

(1) The display panel is made of glass. Do not subject it to mechanical shock by dropping it, etc.
(2) If the display panel is damaged and the liquid crystal fluid inside it leaks out be sure not to get any in your mouth. If the fluid comes into contact with your skin or clothes promptly wash it off using soap and water.
(3) Do not apply excessive force to the display surface or the bezel since this may cause the color tone to vary.
(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle the polarizer carefully.
(5) If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is still not completely clear use a moist cloth with one of the following solvents:

- Isopropyl alcohol

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

- Water
- Ketone
- Aromatic solvents

(6) POL surface temperature shall not exceed 95℃ when the product is used or tested.
(7) The storage or use environment must not contain an acid or base environment. For example NH3, SO2…
(8) Do not attempt to disassemble the LCD Module.
(9) If the logic circuitry is powered off, do not apply the input signals.
(10) To prevent destruction of the module by static electricity, be careful to maintain an optimum work environment.
(11) Be sure to ground your body when handling the LCD Modules.
(12) Tools used for assembly, such as soldering irons, must be properly grounded.
(13) To reduce the amount of static electricity generated, do not conduct assembly or other work under very low humidity conditions.
(14) The LCD Module is covered with a film to protect the display surface. Be careful when peeling off this protective film since static electricity may be generated.

13.2 Storage precautions

(1) When storing the LCD modules avoid exposure to direct sunlight or to the light of fluorescent lamps.
(2) The LCD modules should be stored within the rated storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:
Temperature: 15 ~ 35 degree C (or at least Temp. 10 ~ 40 degree C / Humidity 25% ~ 75%), for National Std. recommendation
(3) The LCD modules should be stored in a room without acid, alkali or other harmful gases.

13.3 Transportation Precautions

The LCD modules should not be dropped or subject to violent mechanical shock during transportation. Also they should avoid excessive pressure, water, high humidity and direct sunlight.

14. Contact Us

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