

SPECIFICATION

[☒] Preliminary Specification
[] Final Specification

Description 19” 1920xRGBx1536 TFT-LCD Module
Part Number P1900FHF1MB00

Customer		Product Dept, PDBU Tianma Microelectronics Co., Ltd.	
Signatures	Date	Approved By	Date
		Kevin Kim	2025/12/17
		Reviewed By	
		Longping Deng	2025/12/17
		Prepared By	
		Anna Huang	2025/12/17
Comments:			

* This cover page is for your Comments and Signatures back to TIANMA.

REVISION HISTORY

Rev	Date	Page	Revision Items	Editor
1.0	2025/12/12	-	Preliminary spec	Anna Huang
1.1	2025/12/17		Thickness adjust 12.2→12mm in page 1 Mechanical drawing update in page 16	Anna Huang

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1. Summary

1.1 General Description

This is a 19 inch a-Si TFT-LCD module with Normal- Black technology. It is composed of a TFT-LCD panel, a driver circuit, PCB, and a LED backlight unit.

1.2 Features

- Ultra-wide viewing angle
- High resolution
- Interface: LVDS
- LED driver integrated
- Acquisition product for UL62368-1/CSA C22.2 No.62368-1-03 (File number: TBD)
- Compliant with the European RoHS Directive (2011/65/EU) and Delegated Directive (2015/863/EU, Amending Annex II of 2011/65/EU)

2. General Specifications

Feature		Spec	Unit
Display Spec	Size	19 inches	
	Resolution	1920(RGB)x1536	
	Pixel Pitch	0.19602x0.19602	mm
	TFT Active Area	376.3584 x 301.0867	mm
	Technology Type	a-Si	
	Pixel Configuration	R.G.B Vertical Stripe	
	Display Mode	SFT, Normally Black	
	Surface Treatment	Anti-Glare	
	Viewing Direction	All	
	Gray Scale Inversion Direction	No Gray Scale Inversion	
Mechanical Characteristics	LCM (W x H x D)	396 x 324 x12	mm
	Weight	TBD	g
Optical Characteristics	Luminance	500	cd/m ²
	Contrast Ratio	1300:1	
	NTSC	90	%
	Viewing Angle	89/89/89/89	degree
Electrical Characteristics	Interface	LVDS	
	Color Depth	16.7 Million	color
	Power Consumption	LCD:TBD Backlight:TBD	mW

Table 2.1 General TFT Specifications

3. Input / Output Terminals

3.1 CN1 Pin assignment (LCD Interface)

Connector Information	
LCD Module connector	DF14H-30P-1.25H(52)
Matching connector	DF14-30S-1.25C(10)

Table 3.1.1 Connector information

No	Symbol	I/O	Description	Comment
1	ORX0-	I	- LVDS differential data input	
2	ORX0+	I	+ LVDS differential data input	
3	ORX1-	I	- LVDS differential data input	
4	ORX1+	I	+ LVDS differential data input	
5	ORX2-	I	- LVDS differential data input	
6	ORX2+	I	+ LVDS differential data input	
7	GND	P	Ground	
8	ORXC-	I	- LVDS differential clock input	
9	ORXC+	I	+ LVDS differential clock input	
10	ORX3-	I	- LVDS differential data input	
11	ORX3+	I	+ LVDS differential data input	
12	ERX0-	I	- LVDS differential data input	
13	ERX0+	I	+ LVDS differential data input	
14	GND	P	Ground	
15	ERX1-	I	- LVDS differential data input	
16	ERX1+	I	+ LVDS differential data input	
17	GND	P	Ground	
18	ERX2-	I	- LVDS differential data input	
19	ERX2+	I	+ LVDS differential data input	
20	ERXC-	I	- LVDS differential clock input	
21	ERXC+	I	+ LVDS differential clock input	
22	ERX3-	I	- LVDS differential data input	
23	ERX3+	I	+ LVDS differential data input	
24	GND	P	Ground	
25	GND	P	Ground	
26	GND	P	Ground	
27	GND	P	Ground	
28	VCC	P	Power supply(5V)	
29	VCC	P	Power supply(5V)	
30	VCC	P	Power supply(5V)	

Table 3.1.2 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.

3.2 CN2 Pin assignment (Back Light)

Connector Information	
Back light connector	SM08B-GHS-TB
Matching connector	GHR-08V-S

Table 3.2.1 Connector information

No	Symbol	I/O	Description	Comment
1	VLED	P	Power supply(12V)	
2	VLED	P	Power supply(12V)	
3	VLED	P	Power supply(12V)	
4	GND	P	Ground	
5	GND	P	Ground	
6	GND	P	Ground	
7	EN	I	Backlight on/off control signal(1:on, 0:off)	
8	PWM	I	Dimming control signal	

Table 3.2.2 Pin Assignment for Back Light 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.

4. Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Power Voltage	VCC	0.3	5.5	V	Note1
BL_POWER Input	LED_VCCS	-0.3	13.2	V	
BL_PWM signal input	LED_PWM	-0.3	3.6	V	
BL_ENABLE	LED_EN	-0.3	3.6	V	
Operating Temperature	Top	-20	70	°C	
Storage Temperature	Tst	-30	80	°C	
Relative Humidity Note2	RH	--	≤95	%	Ta≤40°C
		--	≤85	%	40°C < Ta≤50°C
		--	≤55	%	50°C < Ta≤60°C
		--	≤36	%	60°C < Ta≤70°C
		--	≤24	%	70°C < Ta≤80°C
Absolute Humidity	AH	--	≤70	g/m³	Ta>70°C

Table 4.1 Absolute Maximum Ratings

Note1: Input voltage include all in put data.

Note2: Ta means the ambient temperature. It is necessary to limit the relative humidity to the specified temperature range. Condensation on the module is not allowed.

Note3: The absolute maximum rating values of this product are not allowed to be exceeded at any times. A module should be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme condition, the module may be permanently destroyed

5. Electrical Characteristics

5.1 DC Characteristics for Panel Driving

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Supply Voltage		VCC	4.5	5	5.5	V	Include ripple
VDD Current	60Hz	IVCC	--	TBD	TBD	mA	White pattern
Power Consumption	60Hz	PVCC	--	TBD	TBD	mW	
Inrush current		Irush	--	--	1.5	A	Note2
Differential input high threshold voltage		R_{xVTH}	+100	--	--	mV	$R_{xVCM}=1.2V$
Differential input low threshold voltage		R_{xVTL}	--	--	-100	mV	
Input voltage range(single-end)		R_{xVIN}	0	--	2.4	V	
Differential input common mode voltage		R_{xVCM}	1.0	1.2	$2.4 - V_{ID} /2$	V	
Differential input voltage		$ V_{ID} $	100	--	600	mV	

Table 5.1.1 Operating Voltages

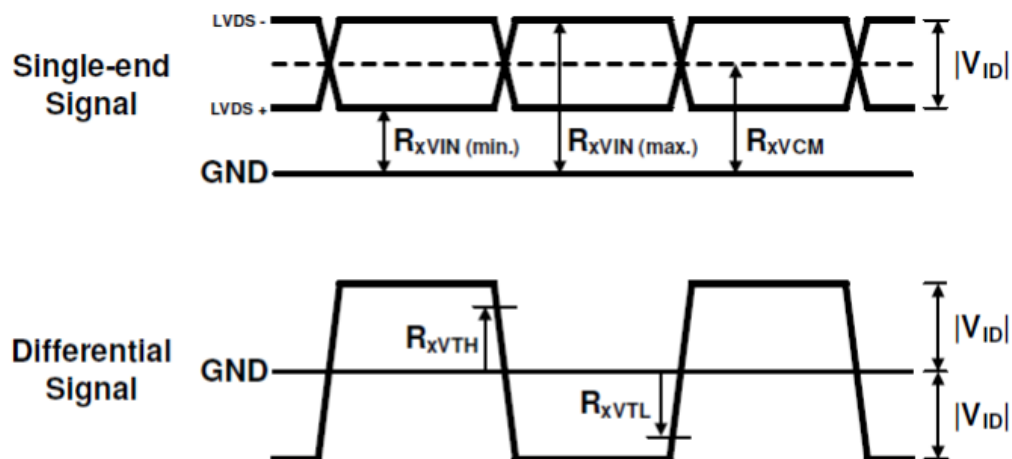
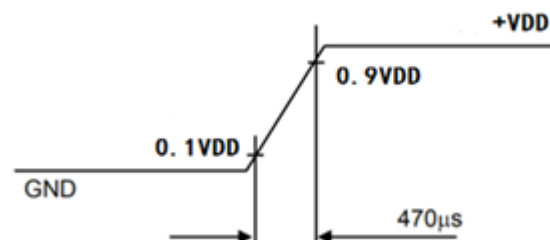


Figure 5.1.1 LVDS DC Characteristics

Note1: Indicated the subsequent version may be updated.

Note2: To test the current dissipation, using the “white pattern” shown

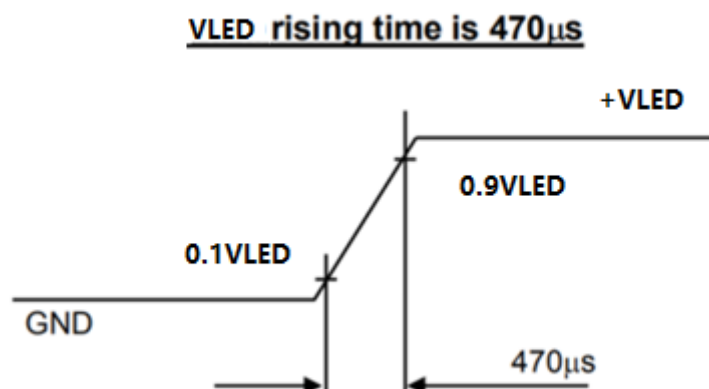
VCC rising time is 470 μ s



5.2 DC Characteristics for Backlight Driving

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Backlight Driving Input Voltage		VLED	11	12	13	V	
VCC Current		Ivled	--	TBD	TBD	mA	100% Dimming
Backlight Power Consumption		P	--	TBD	TBD	mW	100% Dimming
PWM frequency		F	100	--	50K	Hz	
PWM duty		D	5	--	100	%	
Enable、Dimming	High level	--	2	-	5.5	V	Enable、Dimming
	Low level	--	-	-	0.8	V	
LED Forward Current		If	-	100	-	mA	
LED life time		--	--	50000	-	Hrs	PWM 100%
Inrush current		Irush	--	--	1.5	A	Note5

Table 5.2.1 LED Backlight Characteristics



Note1: I_F is defined for each channel.

Note2: Optical performance should be evaluated at $T_a=25^{\circ}\text{C}$ only.

Note3: If LED is driven by high current, high ambient temperature & humidity condition, The life time of LED will be reduced.

Note4: Operating life means brightness goes down to 50% of initial brightness. Typical operating life time is estimated data.

5.3 DC Characteristics For Fuse

Parameter	Fuse	Rating	Clear-time at 25 $^{\circ}\text{C}$	
	Type			
VL for Panel	SMFF0603P250	32V 2.5A	6.25 A	5 seconds(max)
VL for Backlight	FHC32502ADTP	32V 5A	12.5 A	5 seconds(max)

5.4 Recommended Power ON/OFF Sequence

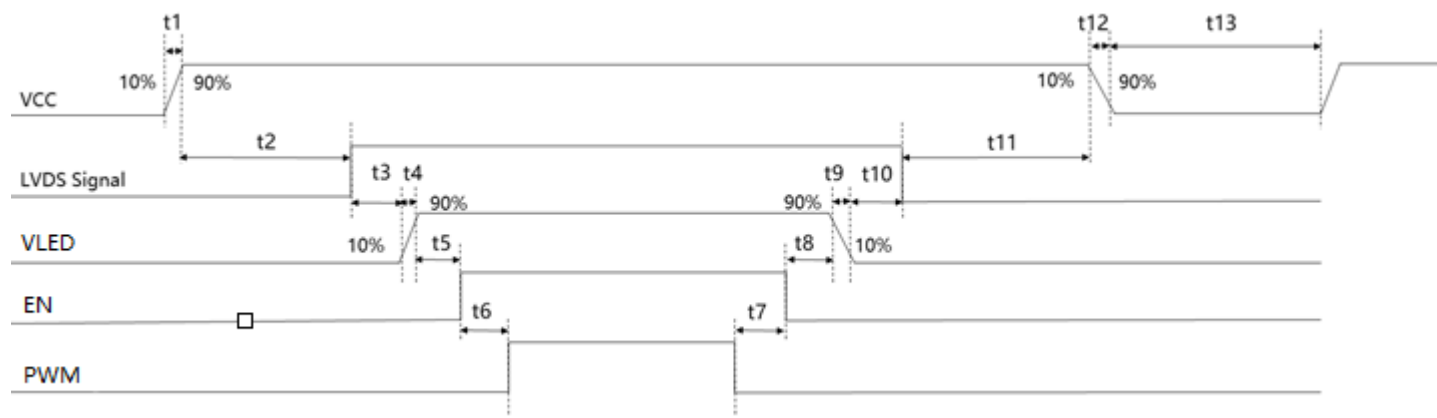


Figure 5.3.1 Power on/off sequence

Symbol	Min	Typ	Max	Unit	Remark
t1	0.5	-	10	ms	
t2	100	-	-	ms	
t3	200	-	-	ms	
t4	1	-	-	ms	Note 1
t5	2	-	-	ms	
t6	2	-	-	ms	
t7	2	-	-	ms	
t8	2	-	-	ms	
t9	1	-	-	ms	
t10	200	-	-	ms	
t11	200	-	-	ms	
t12	-	-	200	ms	
t13	1000	-	-	ms	

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: The power on/off sequence is the first version. It will be updated when the design is fixed.

Note4: Keep Enable low level until the display has stabilized.

Note5: Indicated the subsequent version may be updated.

5.5 LCD Module Block Diagram

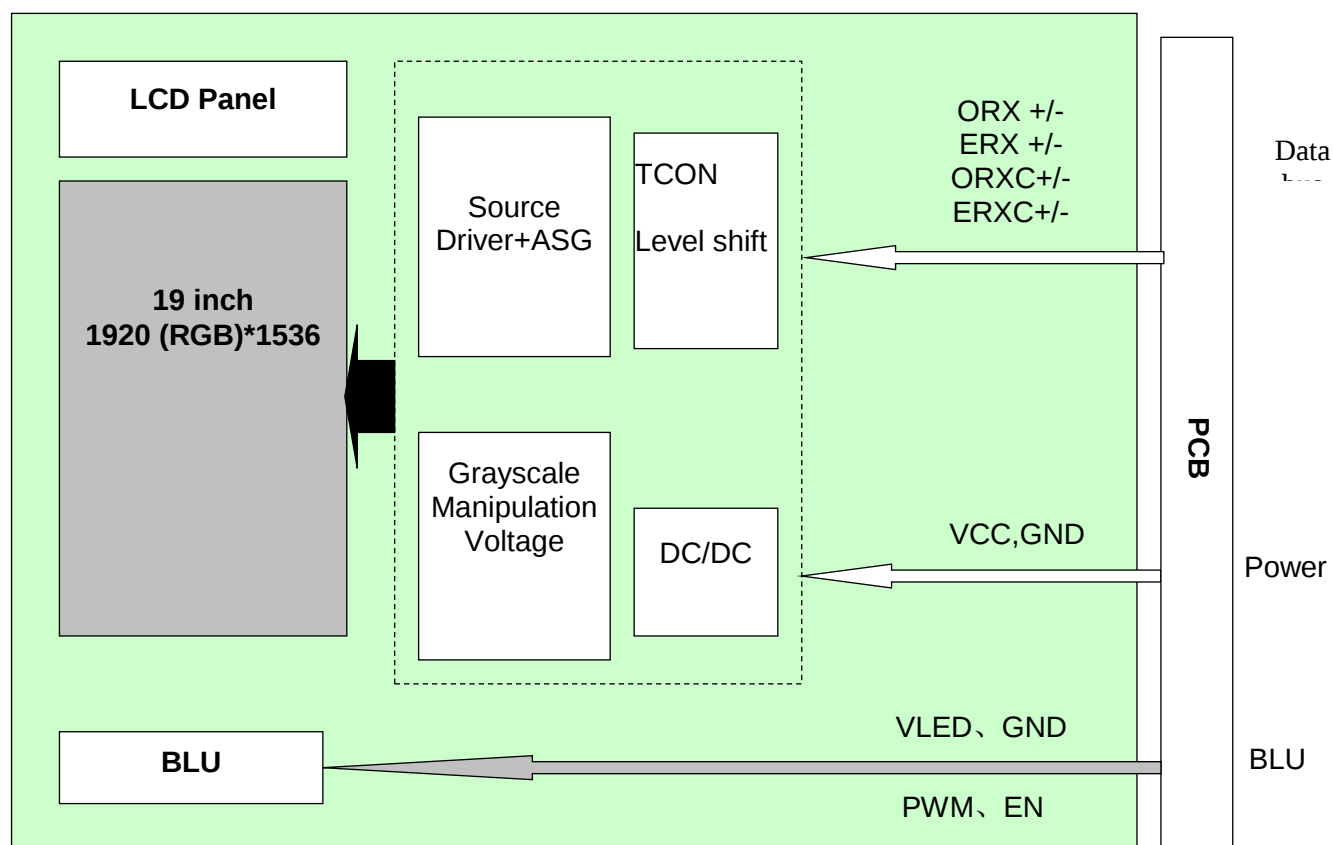


Figure 5.5.1 LCD Module Block Diagram

6. Timing Characteristics

6.1 AC Electrical Characteristics

Parameter	Symb ol	Condition	Min.	Typ.	Max.	Unit
Clock frequency	R_{xCLK}		-	104.3	-	MHz
Input data Position0	t_{RIP1}		$- t_{RMG} $	0.0	$ t_{RMG} $	ns
Input data Position1	t_{RIP0}		$T/7 - t_{RMG} $	$T/7$	$T/7 + t_{RMG} $	ns
Input data Position2	t_{RIP6}		$2T/7 - t_{RMG} $	$2T/7$	$2T/7 + t_{RMG} $	ns
Input data Position3	t_{RIP5}		$3T/7 - t_{RMG} $	$3T/7$	$3T/7 + t_{RMG} $	ns
Input data Position4	t_{RIP4}		$4T/7 - t_{RMG} $	$4T/7$	$4T/7 + t_{RMG} $	ns
Input data Position5	t_{RIP3}		$5T/7 - t_{RMG} $	$5T/7$	$5T/7 + t_{RMG} $	ns
Input data Position6	t_{RIP2}		$6T/7 - t_{RMG} $	$6T/7$	$6T/7 + t_{RMG} $	ns
Input data skew margin	T_{RSKM}	$R_{xCLK} = 85\text{MHz}$ $R_{xVTH} - R_{xVTL} = 200\text{ mV}$	-400	-	+400	ps
Input spread spectrum ratio	SS_R		-	-	+/-3	%
Input modulation frequency	F_M		-	-	300k	Hz
Jitter tolerance	T_{jitter_tol}				200	ps

Table 6.1.1 LVDS AC Characteristics

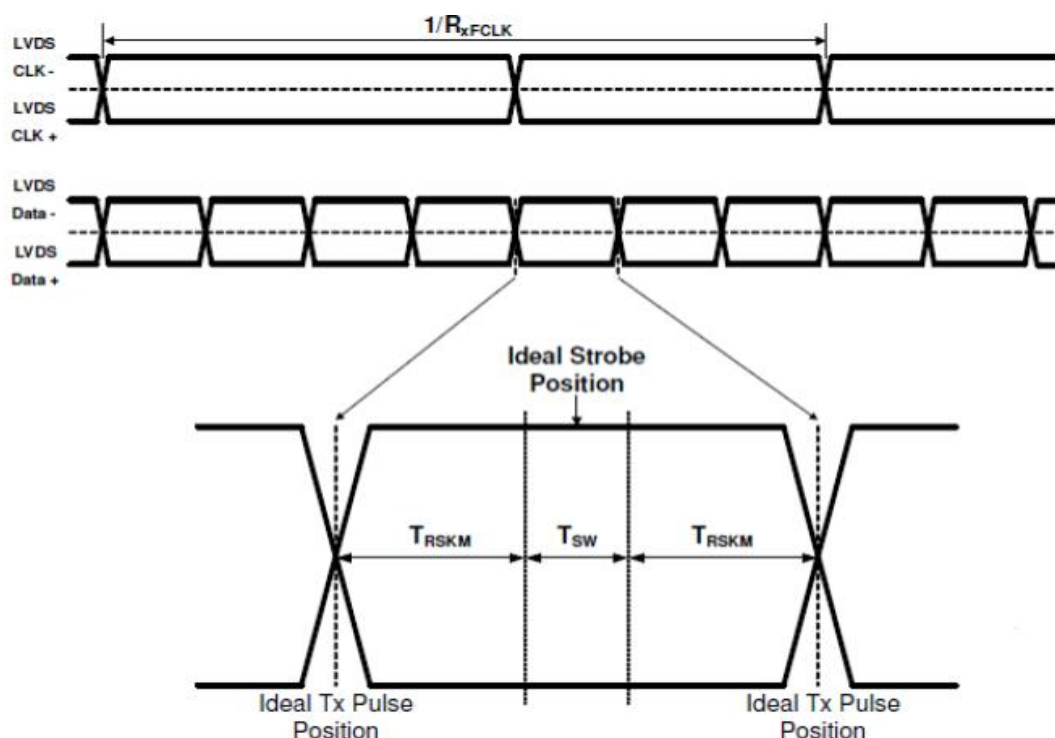


Figure 6.1.1 LVDS DC Characteristics

Note1: T_{SW} : Strobe width (LVDS IP internal data sampling window)

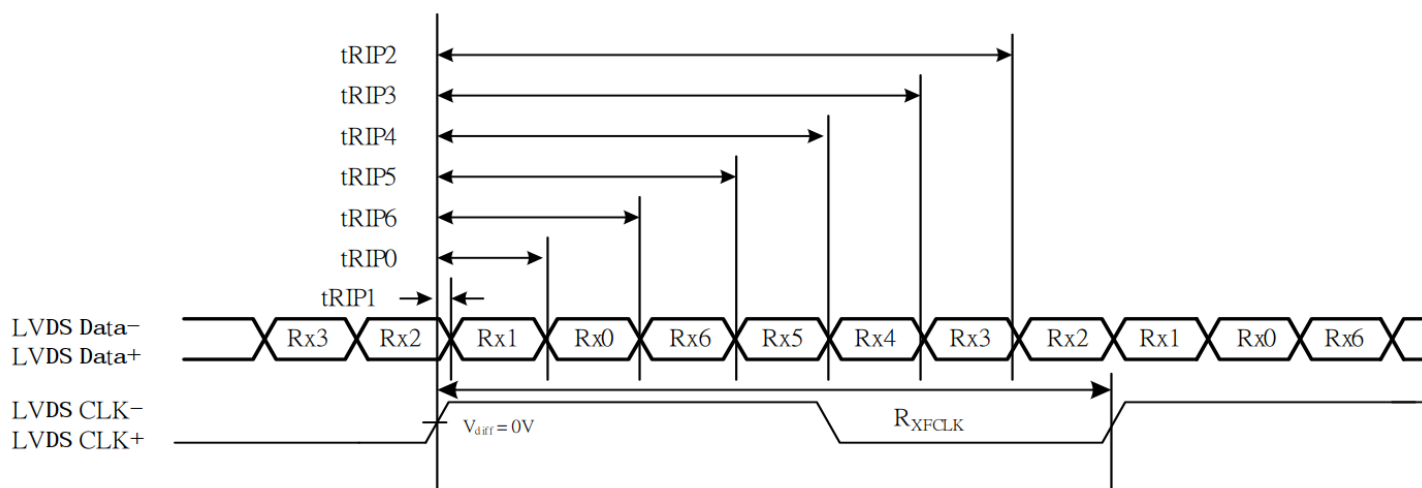


Figure 6.1.1 LVDS AC Characteristics

6.2 LVDS signal timing characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK frequency		Fclk	TBD	104.30	TBD	MHz	Tclk=1/Fclk
Horizontal section	Horizontal total	Th	TBD	1110	TBD	Tclk	
	Horizontal blanking	Thb	TBD	150	TBD	Tclk	
	Valid Data Width	Thd	960			Tclk	
Vertical section	Vertical total	Tv	TBD	1566	TBD	TH	
	Vertical blanking	Tvb	TBD	30	TBD	TH	
	Valid Data Width	Tvd	1536			TH	
Frame Rate		FR	60			Hz	

Table 6.2.1 Input Timing Parameters

Note1: Timing is unverified, for reference only. Update after verification.

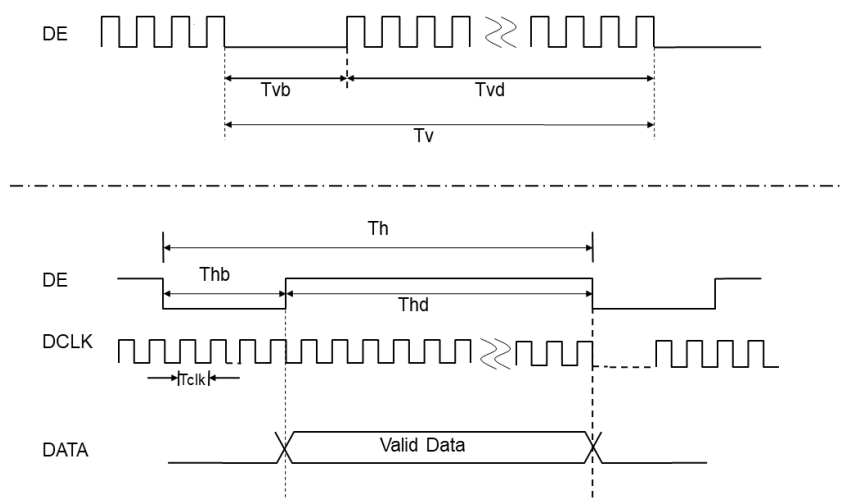


Figure 6.2.2 Clock and Data Input Timing Diagram

6.3 LVDS data mapping

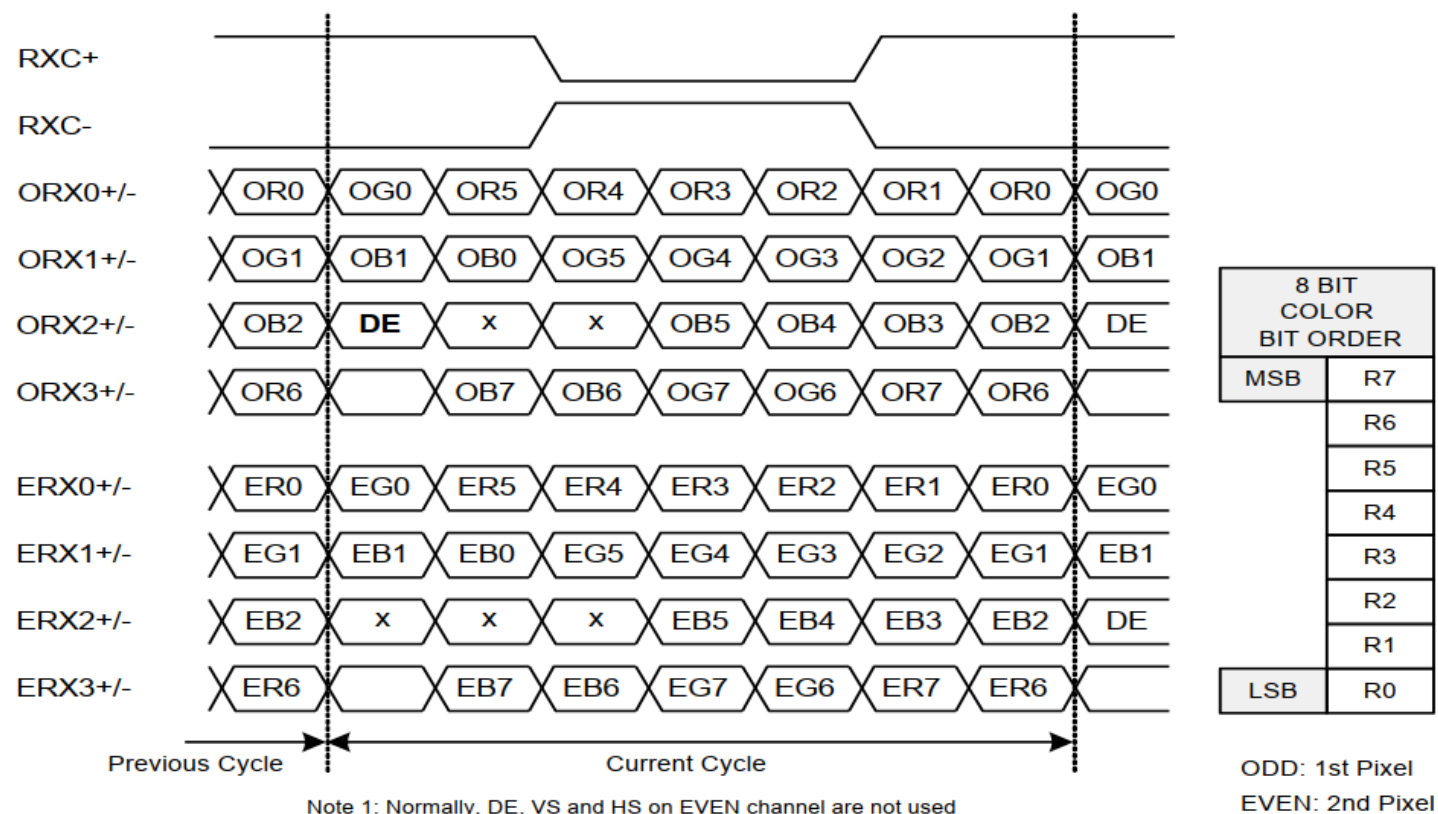


Figure 6.3.1 LVDS data mapping (VESA standard)

7. Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	80	89		degree	Note2,3
		θB		80	89			
		θL		80	89			
		θR		80	89			
Contrast Ratio		CR	θ=0°	1000	1300			Note 3
Response Time		T _{ON}	25℃		25	35	ms	Note 4
		T _{OFF}						
Chromaticity	White	x	Backlight is on	(0.263)	(0.313)	(0.363)		Note 1,5
		y		(0.279)	(0.329)	(0.379)		
	Red	x		(0.632)	(0.682)	(0.732)		Note 1,5
		y		(0.266)	(0.316)	(0.366)		
	Green	x		(0.213)	(0.263)	(0.313)		Note 1,5
		y		(0.627)	(0.677)	(0.727)		
	Blue	x		(0.100)	(0.150)	(0.200)		Note 1,5
		y		(0.012)	(0.062)	(0.112)		
Uniformity		U		75	80		%	Note 6
NTSC		-		89	90		%	Note 5
Luminance		L		400	500		cd/m ²	Note 7

Table 7.1 Optical Parameters

Test Conditions:

1. $I_F = XX$ mA, and the ambient temperature is 25°C.
2. The test systems refer to Note1 and Note2.

Note1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical characteristics are measured at the center point of the LCD screen.

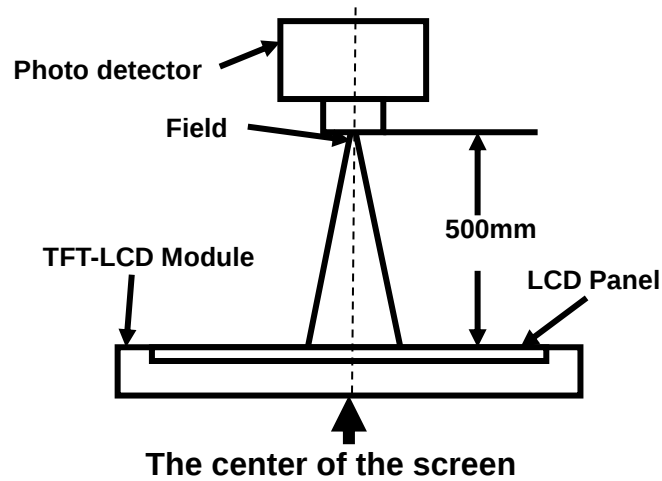


Fig1. Measurement Set Up

Note2: Definition of viewing angle range and measurement system. Viewing angle is measured at the center point of the LCD .

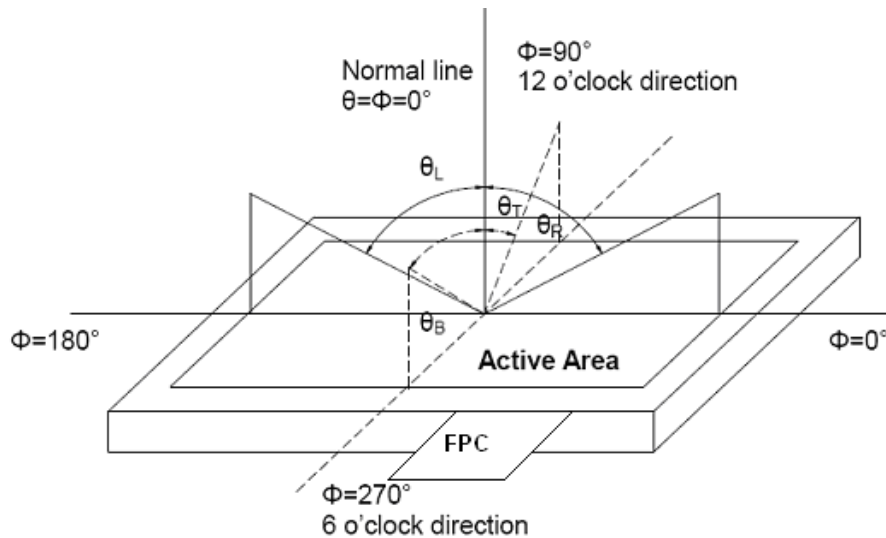


Fig2. Measurement viewing angle

Note3: Definition of contrast ratio

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

Note4: Definition of Response time

For SFT LCM, the response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_r) is the time between photo detector output intensity changed from 10% to 90%. And fall time (T_f) is the time between photo detector output intensity changed from 90% to 10%.

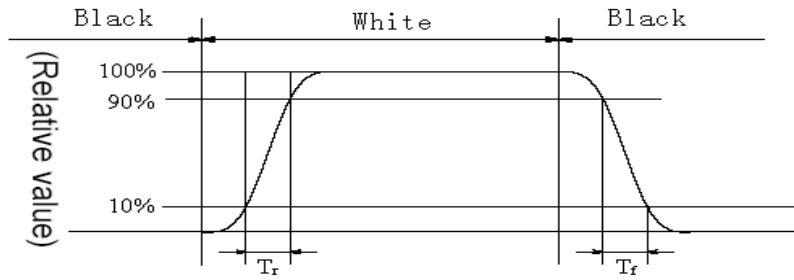


Fig4. Response Time Testing(SFT)

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig.5). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = L_{min} / L_{max}

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

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

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

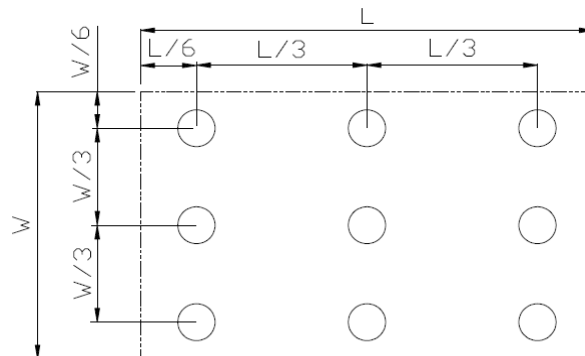


Fig5. Luminance Uniformity Measurement Locations(9 points)

Note7: Definition of Luminance:

Measure the luminance of white state at center point.

8. Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	+70℃ , 240H	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	-20℃ , 240H	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	+80℃ , 240H	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	-30℃ , 240H	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity(non-operation)	+60℃ , 90%RH , 240H	IEC60068-2-78 :2001 GB/T 2423.3-2016
6	Thermal Shock (non-operation)	-30℃ , 30min~80℃ , 30min , change time : 5min , 100cycle	Start with cold temperature, End with high temperature, IEC60068-2-14:1984, GB/T 2423.22-2012
7	ESD	C=150pF , R=330Ω , 5point/panel Air : ±15kv , 5times ; Contact : ±8kv , 5times ; (Environment : 15℃~35℃ , 30%~60% , 86Kpa~106Kpa)	IEC61000-4-2:2001 GB/T 17626.2-2018
8	Vibration (LCM)	5 to 100Hz, 11.76m/s ² 1 minute/cycle X, Y, Z directions 50 times each direction	GB/T 2423.10-2019
9	Shock (LCM)	294m/s ² , 11ms ±X, ±Y, ±Z directions 3 times each direction	GB/T 2423.5-2019
10	Package Vibration	5-20-200HZ , PSD : 0.01-0.01-0.001 Total:0.781g ² /HZ,x/y/z 30min)	GB/T 4857.23-2021
11	Package Drop Test	Height: X cm,1 corner, 3edges, 6 surfaces Note : X > 10Kg:60cm ; ≤10Kg:80cm	IEC60068-2-32:1990 GB/T2423.8—1995

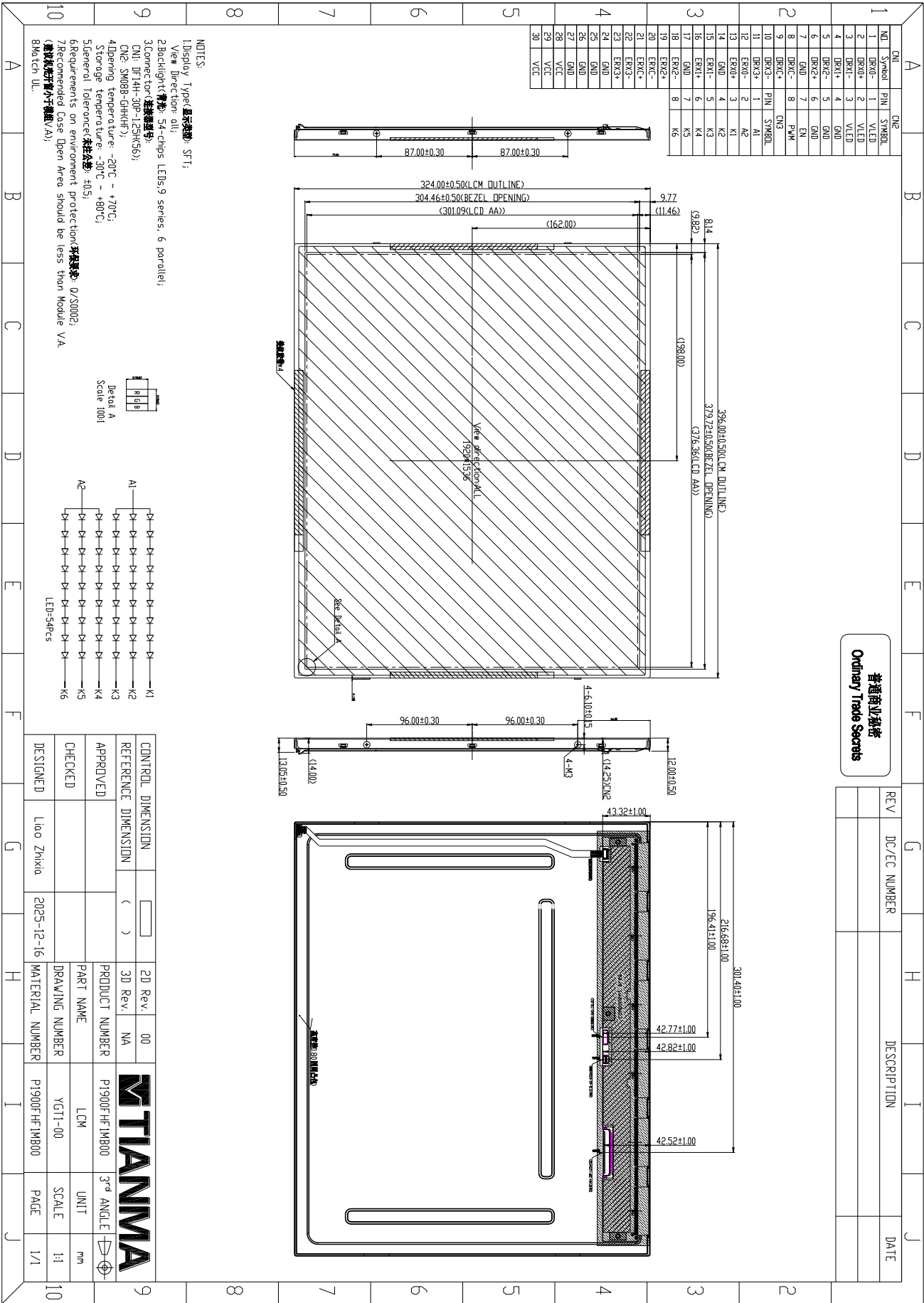
Table 8.1 RA test condition

Note1: Temperature is the ambient temperature of sample

Note2: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product's function only be guaranteed, but not for all of the cosmetic specification.

9. Mechanical Drawing



10. Packing Instruction

No	Item	Model (Material)	Dimensions(m m)	Unit Weight(Kg)	Q'ty	Remark
1	LCM module	P1900FHF1MB00	396*324*12.2		5	
2	Paper card	Corrugated Paper				
3	Carton	Corrugated Paper				
4	Paper board	Corrugated Paper				
5	ESD bubble bag	PE				
6	Total weight	TBD				

TBD

11. Precautions for Use of LCD Modules

11.1 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
 - Ethyl alcohol
 Solvents other than those mentioned above may damage the polarizer. Specifically, do not use the following:
 - Water
 - Ketone
 - Aromatic solvents
- (6) Do not disassemble the LCD Module.
- (7) If powered off, do not apply the input signals.
- (8) To prevent destruction of the module by static electricity, be careful to maintain an optimum work environment.
- (9) Be sure to ground your body when handling the LCD Modules.
- (10) Tools used for assembly, must be properly grounded.
- (11) To reduce the amount of static electricity generated, do not conduct assembly or other work under very low humidity conditions.
- (12) The LCD Module is covered with a film to protect the display surface, remove film slowly under the ionizer.

11.2 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. The recommend condition is: Temperature: 0 ~ 35 °C at normal humidity.
- (3) The LCD modules should be stored in a room without acid, alkali or other harmful gas.

11.3 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.

11.4 Screen saver Precautions

Not display the fixed pattern for a long time. Use a screen saver, if the fixed pattern is displayed on the screen

11.5 Safety Precautions

- (1) When you waste damaged or unnecessary LCDs, it is recommended to crush LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned
- (2) Be sure to turn off the power supply when inserting or disconnecting the LED backlight cable.

- (3) LED driver should be designed to limit or stop its function when over current is detected on the LED.