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Mechanical design



MODEL NO. : TM101DDHG01-00**ISSUED DATE: 2015-06-04****VERSION : Ver 1.0**

- ☒ **Preliminary Specification**
☐ **Final Product Specification**

Customer : _____

Approved by	Notes

TIANMA Confirmed :

Prepared by	Checked by	Approved by
Xianchen.Fu		

This technical specification is subjected to change without notice

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Record of Revision

[illegible]

1 General Specifications

Feature		Spec
Display Spec.	Size	10.1 inch
	Resolution	1024(RGB) × 600
	Technology Type	a-si TFT
	Pixel Configuration	R.G.B. Vertical Stripe
	Pixel pitch(mm)	0.2175x0.2088
	Display Mode	TM, Normally White
	Surface Treatment	AG,HC(3H)
	Viewing Direction	12 o'clock
	Gray Scale Inversion Direction	6 o'clock
Mechanical Characteristics	LCM (W x H x D) (mm)	235.00 x 143.00 x 4.9
	Active Area(mm)	222.72 x 125.28
	With /Without TSP	Without TSP
	LED Numbers	20 LED
	Weight (g)	TBD
Electrical Characteristics	Interface	6/8 bit LVDS
	Color Depth	16.7M
	Driver IC	HX8282*1+HX8677*2

Note 1: Requirements on Environmental Protection: Q/S0002

Note 2: LCM weight tolerance: ± 5%

2 Input/Output Terminals

Recommended connector: IPEX 20455-040E-12R or compatible

Pin	Symbol	I/O	Description	Remark
1	NC		No connection(Reserve)	
2	VCCS	P	Power supply(3.3V typ)	
3	VCCS	P	Power supply(3.3V typ)	
4	VEDID	P	DDC 3.3V power	If EDID function is not used, please keep it floating.
5	NC		No connection(Reserved for TM test)	
6	CLKEDID		DDC clock	If EDID function is not used, please keep it floating.
7	DATAEDID		DDC data	
8	Rxin0-	I	LVDS differential data input	
9	Rxin0+	I		
10	VSS	P	Ground	
11	Rxin1-	I	LVDS differential data input	
12	Rxin1+	I		
13	VSS	P	Ground	
14	Rxin2-	I	LVDS differential data input	
15	Rxin2+	I		
16	VSS	P	Ground	
17	RxCLK-	I	LVDS differential clock input	
18	RxCLK+	I		
19	VSS	P	Ground	
20	Rxin3-	I	LVDS receiver signal channel 3. Pin 20&pin 21 connect to GND for 6bit LVDS input.	
21	Rxin3+	I		
22	VSS	P	Ground	
23	NC		No connection(Reserved for TM test)	
24	NC		No connection(Reserved for TM test)	
25	VSS	P	Ground	
26	NC		No connection(Reserved for TM test)	
27	SEL68		LVDS 6/8 bit selection control SEL68="H":8bit/SEL68="L" or NC:6bit	

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28	VSS	P	Ground	
29	NC		No connection(Reserved for TM test)	
30	NC		No connection(Reserved for TM test)	
31	LED_GND	P	LED ground	
32	LED_GND	P	LED ground	
33	LED_GND	P	LED ground	
34	NC		No connection(Reserve)	
35	LED_PWM		PWM control signal of LED converter	
36	LED_EN		Enable control signal of LED converter	
37	NC		No connection(Reserve)	
38	LED_VCCS		LED power supply(12V typ)	
39	LED_VCCS		LED power supply(12V typ)	
40	LED_VCCS		LED power supply(12V typ)	

Note1: P: Power/GND; I: input pin; O: output

Note2: NC: Please Leave this pin Open.

3 Absolute Maximum Ratings

3.1 Driving TFT LCD Panel

GND=0V, Ta = 25℃

Item	Symbol	Min	Max	Unit	Remark
Power Voltage	VDD	2.8	3.6	V	
EDID drive Voltage	VEDID	-0.3	4	V	
Converter Input Voltage	LED_VCCS	4.2	24	V	
Converter Control Signal Voltage	LED_PWM	-0.3	5.3	V	
Converter Control Signal Voltage	LED_EN	-0.3	5.3	V	
Operating Temperature	TOPR	-20	70	℃	TBD
Storage Temperature	TSTG	-30	80	℃	TBD

4 Electrical Characteristics

4.1 Driving TFT LCD Panel

GND=0V, Ta=25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
POWER Supply Voltage	VDD	2.80	3.30	3.60	V	
Power For Analog Circuit	AVDD	--	11	--	V	
Gate On Voltage	VGH	--	22	--	V	
Gate Off Voltage	VGL	--	-7	--	V	
Common Voltage	Vcom	--	4	--	V	
Input Signal Voltage	Low Level	V _{IL}	GND	-	0.2xVDD	V
	High Level	V _{IH}	0.8xVDD	-	VDD	V
Output Signal Voltage	Low Level	V _{OL}	GND	-	GND+0.4	V
	High Level	V _{OH}	VDD-0.4	-	VDD	V

4.2 Driving Backlight

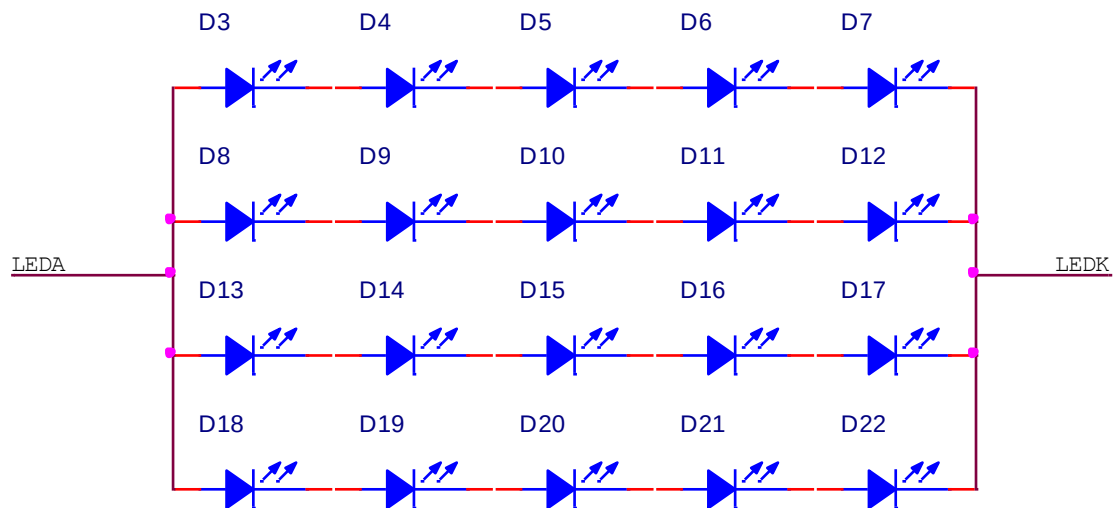
$T_a=25^{\circ}\text{C}$

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I_F	--	240	260	mA	
Forward Current Voltage	V_F	14	16	17.5	V	
LED lifetime	--	15000 hrs				

Note1: The LED driving condition is defined for each LED module.

Note2: Under LCM operating, the stable forward current should be input. And forward voltage is for reference only.

Note3: Optical performance should be evaluated at $T_a=25^{\circ}\text{C}$ only 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.

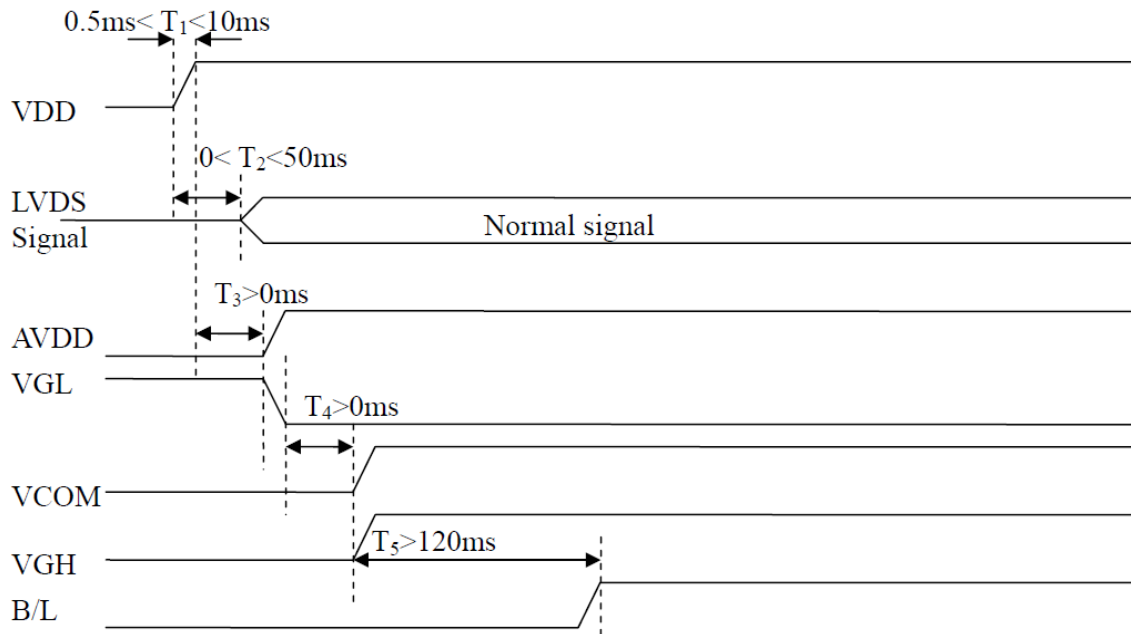


Diagram

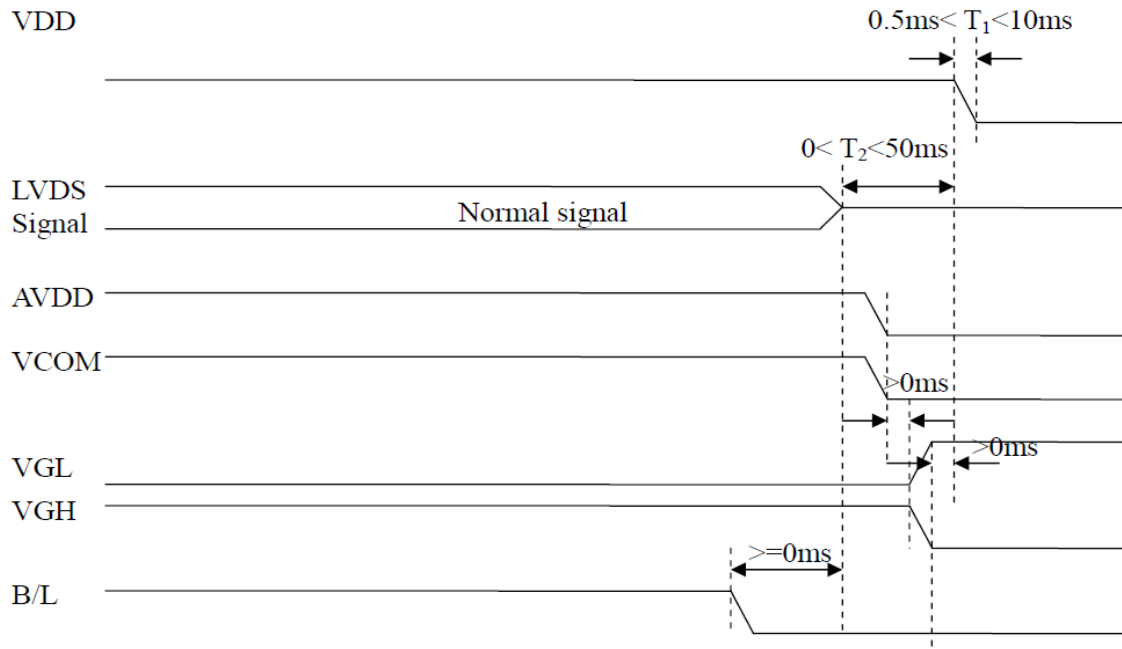
5 Timing Chart

5.1 Power sequence

Power on



Power off

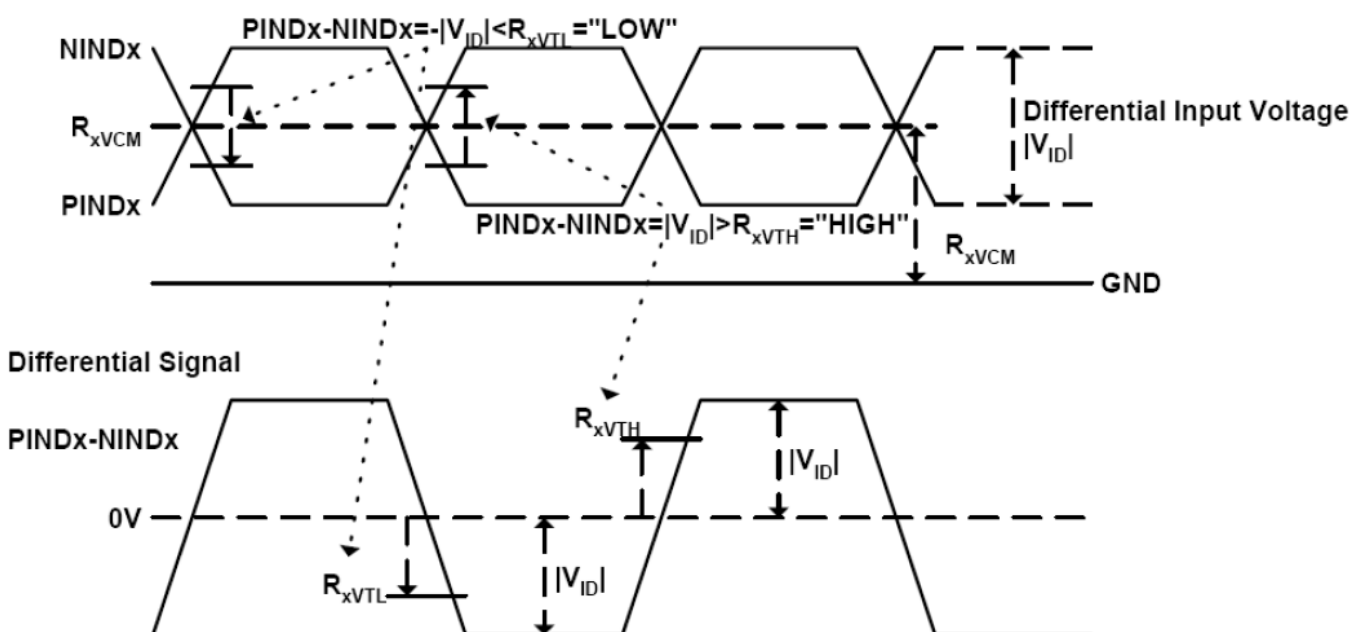


5.2 LVDS signal timing characteristic

Electrical characteristics

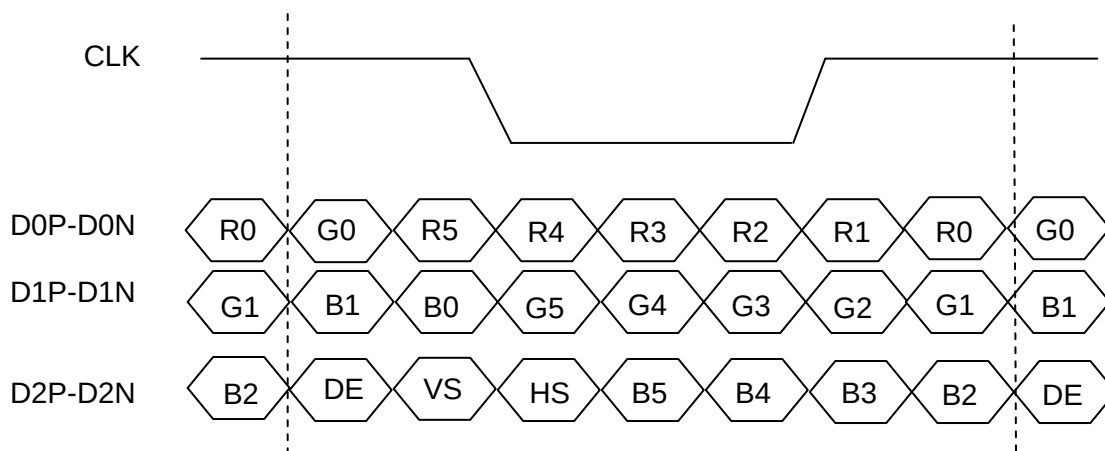
Parameter	Symbol	Value			Unit	Note
		min	typ	max		
LVDS differential input high threshold voltage	R_{xVTH}	-	-	+100	mV	$R_{xVCM}=1.2V$
LVDS differential input low threshold voltage	R_{xVTL}	-100	-	-	mV	
LVDS differential input common mode voltage	R_{xVCM}	1	1.2	1.6	V	
LVDS differential voltage	V_{ID}	200	-	600	mV	

Single-end Signals

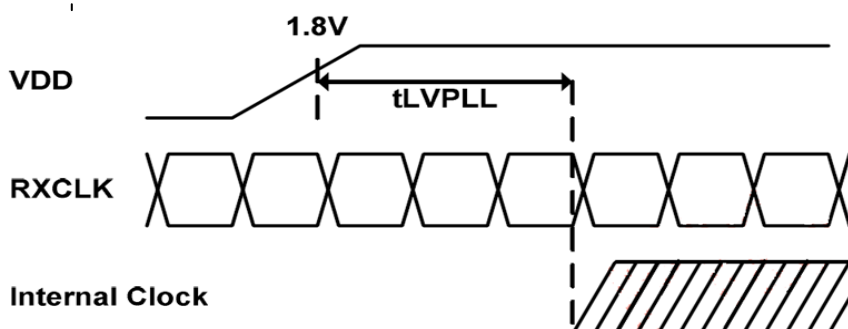
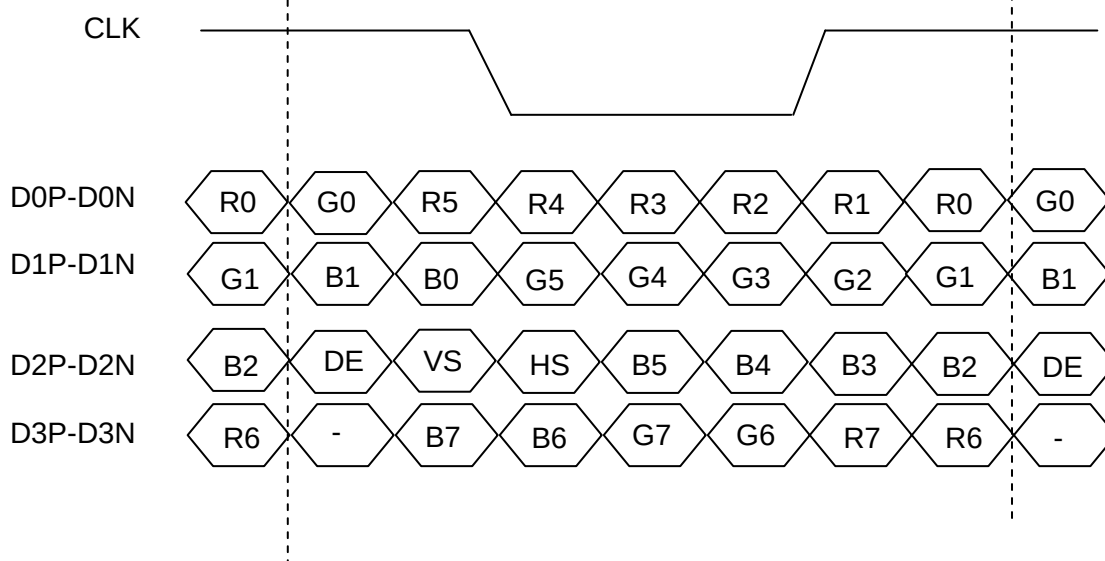


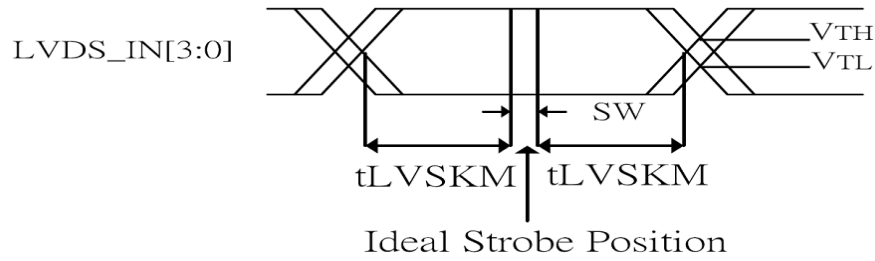
5.3 LVDS data input format

6-bit mode data input



8-bit mode data input





Note1: SW:Setup and hold time

Note2: t_{LVSKM} =400ps at least.

6 Optical Characteristics

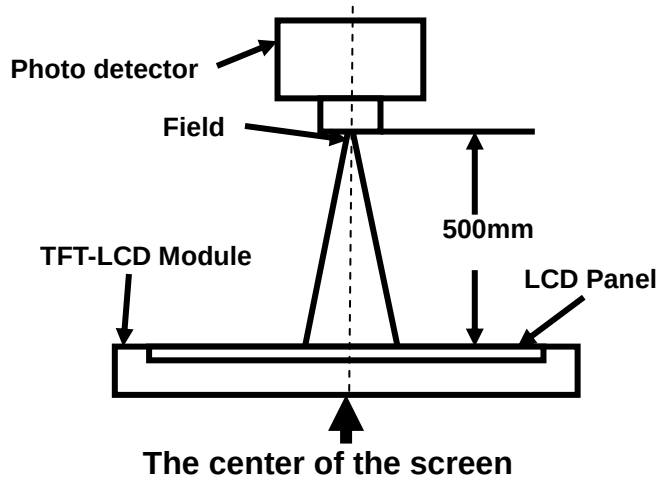
Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≥10	-	75	-	Degree	Note2,3
		θB		-	80	-		
		θL		-	80	-		
		θR		-	80	-		
Contrast Ratio		CR	θ=0°	600	800			Note 3
Response Time		T _{ON}	25℃	-	7	10	ms	Note 4
		T _{OFF}		-	9	18		
Chromaticity	White	x	Backlight is on	-	0.31	-		Note 1,5
		y		-	0.33	-		
	Red	x		-	TBD	-		Note 1,5
		y		-	TBD	-		
	Green	x		-	TBD	-		Note 1,5
		y		-	TBD	-		
	Blue	x		-	TBD	-		Note 1,5
		y		-	TBD	-		
Uniformity		U		70	80	-	%	Note 6
NTSC				-	47	-	%	Note 5
Luminance		L		-	420	-	cd/m ²	Note 7

Test Conditions:

1. $I_F = 20$ mA, and the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

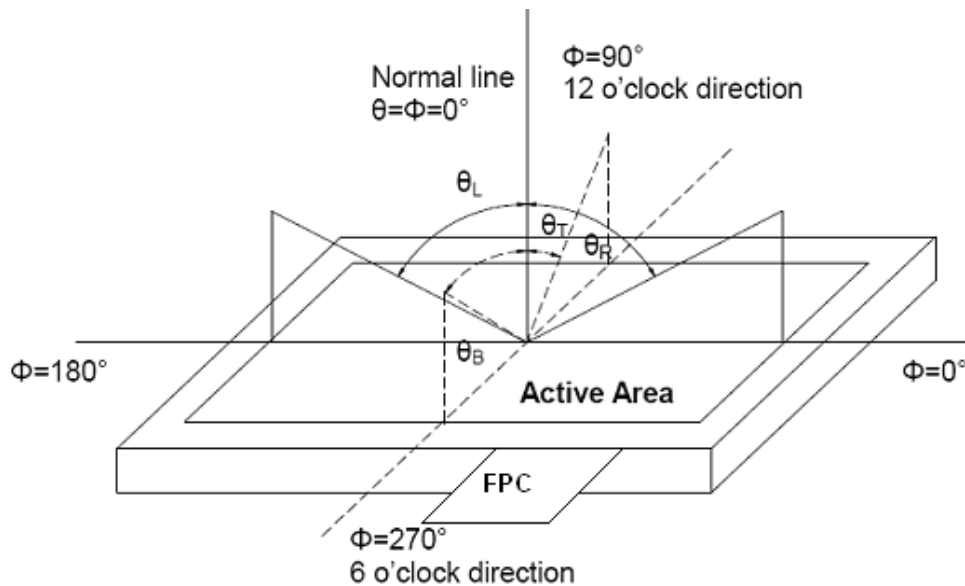
The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



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).



Note 3: Definition of contrast ratio

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

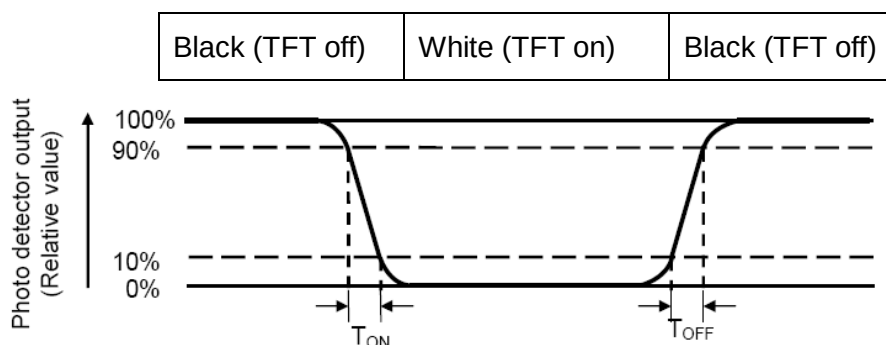
“White state “: The state is that the LCD should drive by Vwhite.

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

V_{white}: To be determined V_{black}: 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 (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

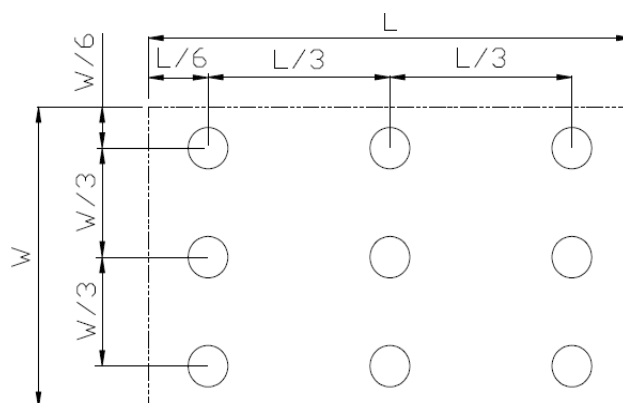
Color coordinates measured at center point of LCD.

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.

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

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



$L_{\max}$: 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 Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +70℃,240hrs	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	Ta= -20℃,240hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta = +80℃,240hrs	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	Ta = -30℃,240 hrs	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity	Ta=+60℃, 90% RH 240 hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30℃ 30 min~+70℃ 30 min, Change time:5min,100 Cycles	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,G B2423.22-2002
7	ESD	C=150pF, R=330Ω,9points/panel Air:± 8KV, 25times, Contact:± 15KV, 25 times,	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration Test	Stroke:1.5G Sweep:10Hz~100Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total)	IEC60068-2-6:1982 GB/T2423.10—1995
9	Mechanical Shock (Non OP)	50G 20ms, ± X,± Y,± Z 3times, for each direction	IEC60068-2-27:1987 GB/T2423.5—1995

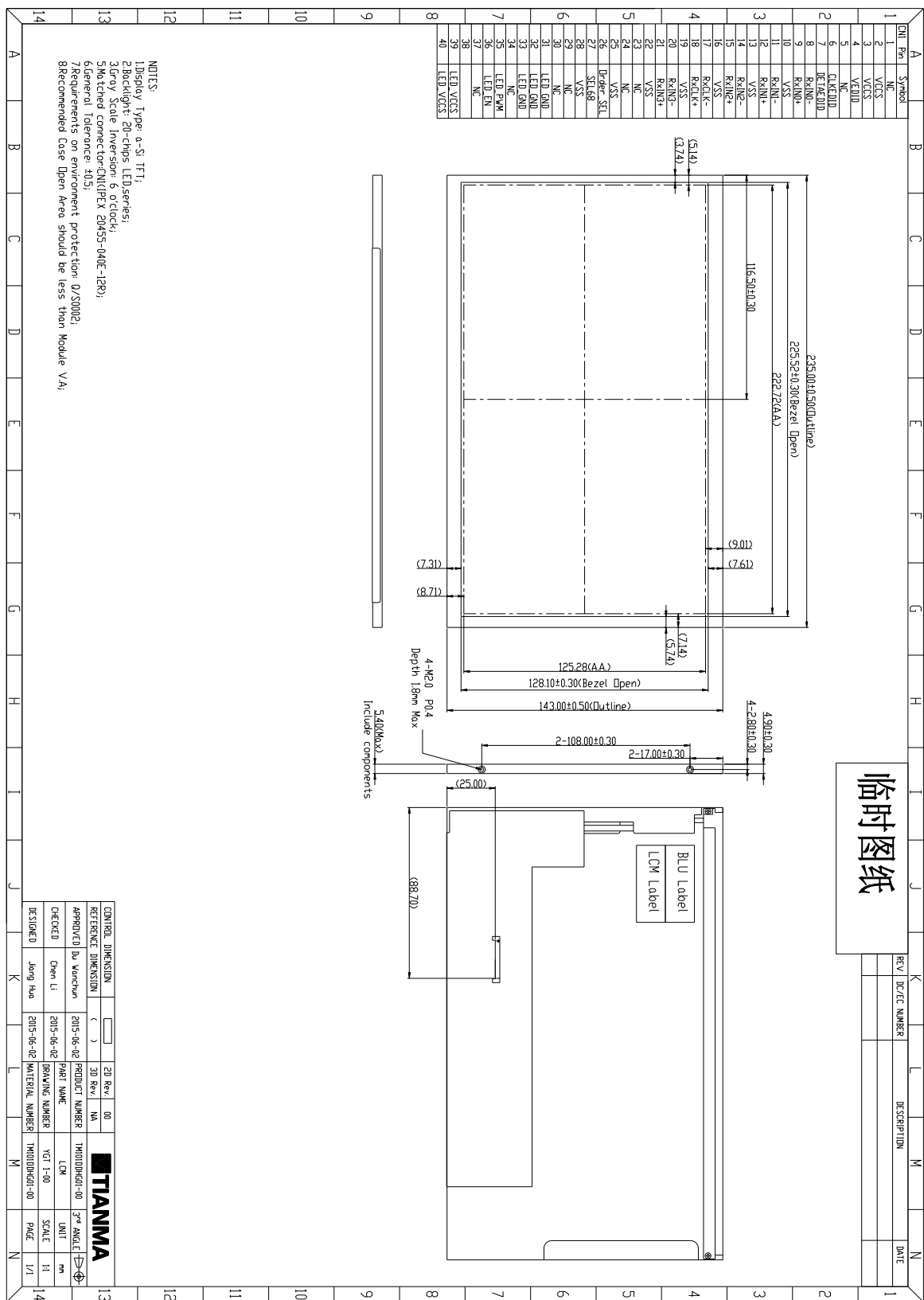
Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

Note3: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note4: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

8 Mechanical Drawing



9 Packing Drawing

No	Item	Model(Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM101DDHG01	235.00X143.00X4.90	TBD	TBD	
2	Tray	PET	Designing	TBD	TBD	
3	Dust-Proof Bag	PE	Designing	TBD	TBD	
4	EPE Spacer	EPE	Designing	TBD	TBD	
5	Carton	Corrugated paper	Designing	TBD	TBD	
6	Total weight	TBD				

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℃ ~ 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

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