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Datasheet

Tianma

P1040XGF1MA00

TI-01-015

MODEL NO : P1040XGF1MA00**SPEC VERSION :** Ver 1.1**ISSUED DATE:** 2020-10-15

- Preliminary Specification
 Final Product Specification

Customer : _____

Approved by	Notes

TIANMA Confirmed :

Prepared by	Checked by	Approved by
Gang.Li		

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Record of Revision

Rev	Issued Date	Description	Editor
1.0	2020-08-05	Preliminary Specification Released.	Gang.Li
1.1	2020-10-15	Update BL pin description on page6.	Gang.Li

1 General Specifications

	Feature	Spec
Display Spec.	Size	10.4 inch
	Resolution	1024(RGB) x 768
	Technology Type	a-Si
	Pixel Configuration	R.G.B. Vertical Stripe
	Pixel pitch(mm)	0.2055x0.2055
	Display Mode	SFT with Normally Black
	Surface Treatment	Anti-Glare
	Viewing Direction	All direction
Mechanical Characteristics	LCM (W x H x D) (mm)	230.00x180.2x9.5
	Active Area(mm)	210.432×157.824
	With /Without TSP	Without Touch screen
	Matching Connection Type	CN1: FI-S20S (JAE) CN2:SHLP-10V-S-B (JST)
	Weight (g)	TBD
Electrical Characteristics	Interface	1port LVDS, 6/8bit selectable
	Color Depth	16.7M/262K

Note 1: Requirements on Environmental Protection: Q/S0002

Note 2: LCM weight tolerance: $\pm 5\%$

2 Input/Output Terminals

2.1 TFT LCD panel

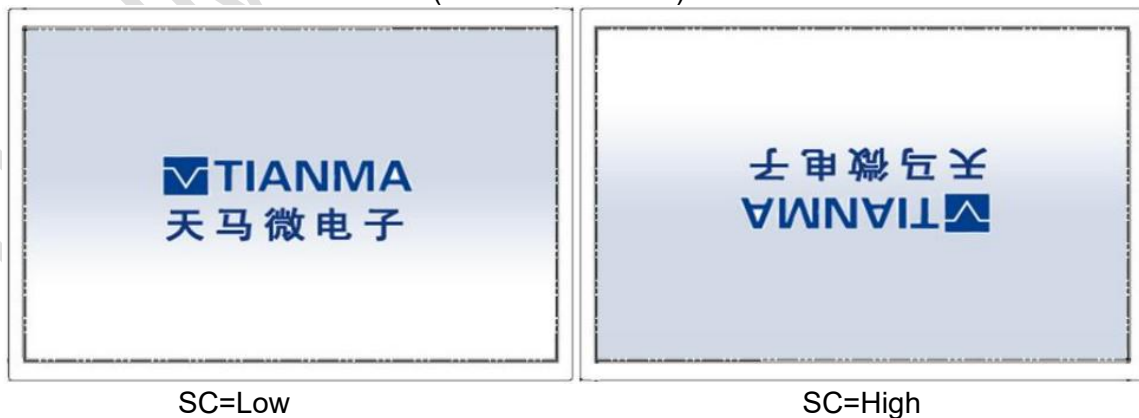
Connector type: JAE FI-SEB20P-HFE

Matching Connector: FI-S20S or compatible

No.	Name	Symbol	Pin Function Description	Remark
1	VCC	P	Power supply(+3.3V)	
2	VCC	P	Power supply(+3.3V)	
3	GND	P	Ground	
4	GND	P	Ground	
5	Link 0-	I	- LVDS differential data input(R0~R5,G0)	
6	Link 0+	I	+ LVDS differential data input(R0~R5,G0)	
7	GND	P	Ground	
8	Link 1-	I	- LVDS differential data input(G1~G5,B0~B1)	
9	Link 1+	I	+ LVDS differential data input(G1~G5,B0~B1)	
10	GND	P	Ground	
11	Link 2-	I	- LVDS differential data input (B2~B5,-,-,DE)	
12	Link 2+	I	+ LVDS differential data input (B2~B5,-,-,DE)	
13	GND	P	Ground	
14	CLKIN	I	- LVDS differential data input	
15	CLKIN	I	+ LVDS differential data input	
16	GND	P	Ground	
17	Link 3-	I	- LVDS differential data input(R6~R7,G6~G7,B6~B7)	
18	Link 3+	I	+ LVDS differential data input(R6~R7,G6~G7,B6~B7)	
19	Mode	I	L: 6bit H: 8bit	
20	SC	I	Display direction selection	

P: Power/GND; I: Input pin

Note : Scan direction is shown as below(PCB at down side):



2.2 Backlight(CN2)

Connector : SM10B-SHLS-TF(LF)(SN)
Matching connector: SHLP-10V-S-B

No.	Name	Symbol	Pin Function Description	Remark
1	NC	-	No connection	
2	NC	-	No connection	
3	LED_K1		LED Cathode 1	
4	LED_A1		LED Anode1	
5	LED_A2		LED Anode2	
6	LED_K2		LED Cathode 2	
7	LED_K3		LED Cathode 3	
8	LED_A3		LED Anode3	
9	LED_A4		LED Anode4	
10	LED_K4		LED Cathode 4	

P: Power/GND; I: input pin

3 Absolute Maximum Ratings

3.1 Driving TFT LCD Panel

GND=0V, Ta = 25°C

Item	Symbol	Min	Max	Unit	Remark
Power Voltage for LCD	VDD	-0.5	5.0	V	Note1
Input voltage for LCD	VIN	-0.5	5.0	V	
Operating Temperature	TOPR	-30	+80	°C	Note2
Storage Temperature	TSTG	-40	+85	°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/m ³	Ta > 70°C

Table 3 Absolute Maximum Ratings

 Note1: V_{IN} represents Link 0-/+, Link 1-/+, Link 2-/+, Link 3-/+, CLKIN-/+, Mode, SC.

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.

4 Electrical Characteristics

4.1 Driving TFT LCD Panel

GND=0V, Ta=25°C

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Power supply Voltage	VDD	3.20	3.30	3.40	V	
Power supply ripple	Vp-p	-	-	100	mV	
Power supply current	IDD	300	450	675	mA	
Power consumption	P	-	1485	-	mW	Note1
Differential input voltage	Vid	200	-	600	mV	
Differential input common voltage	Vcm	-	1.2	-	V	
Differential input threshold voltage	Low level	VTL	-100	-	mV	
	High level	VTH	-	-	100	mV
Inrush current	Irush	-	-	1.5	A	Note2

Table 4.1 LCD module electrical characteristics

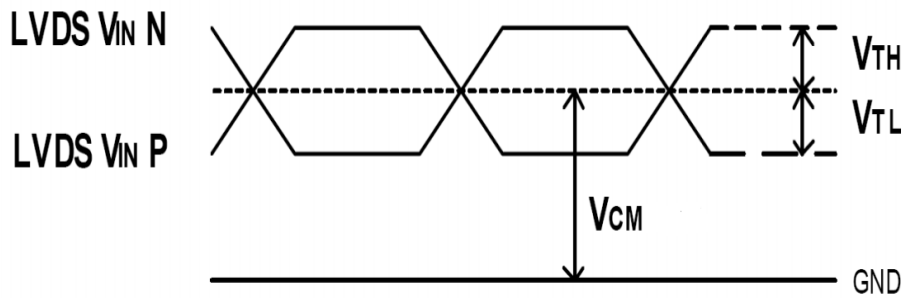
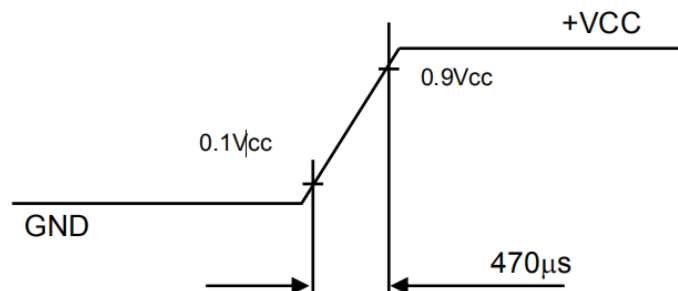


Figure 4.1.1 LVDS DC timing diagram

Note1: To test the current dissipation, using the “white” testing pattern.

Vcc rising time is 470μs



Note2: Inrush current definition.

4.2 Driving Backlight

Ta=25°C

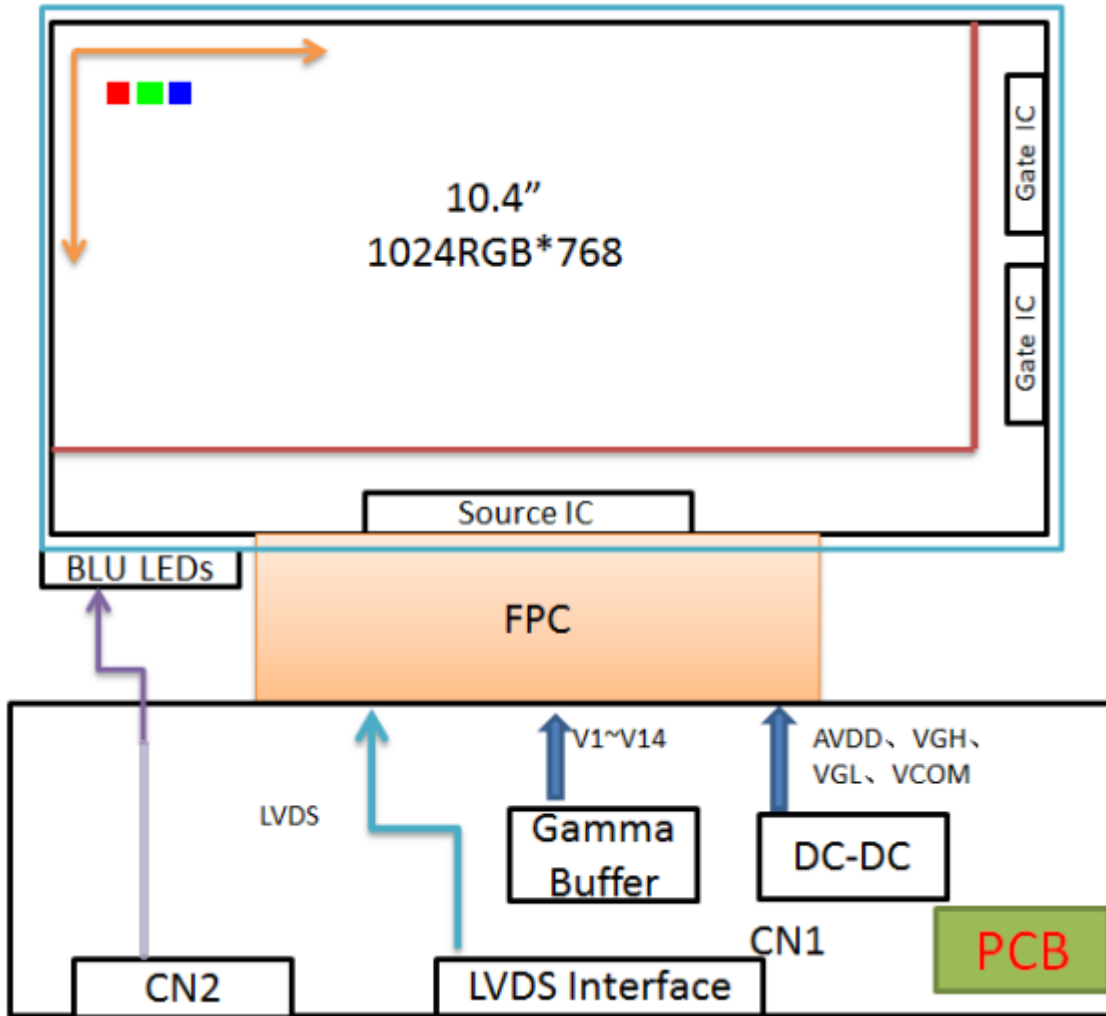
Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I _F	-	480	-	mA	24 LEDs (6LED Serial, 4 LED Parallel)
Forward Current Voltage	V _F	-	19.2	-	V	
Backlight Power Consumption	W _{BL}	-	9216	-	mW	
Operating Life Time	--	-	100000	-	hrs	Note

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

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

Note3: Optical performance should be evaluated at Ta=25°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.

4.3 Block Diagram



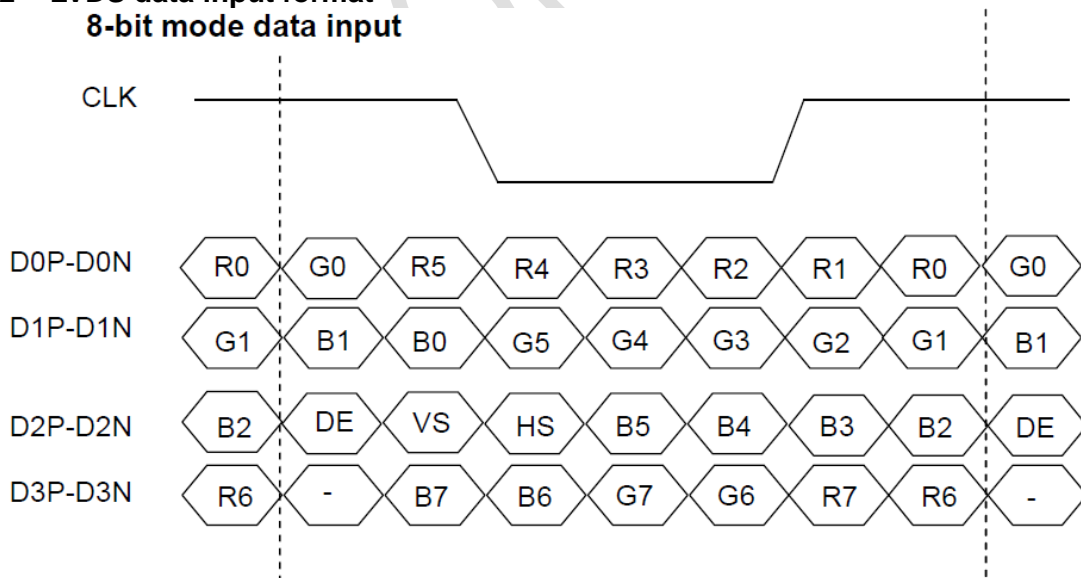
5 Timing Chart

5.1 Timing Parameter

Parameter	Symbol	Min	Typ	Max	Unit	Remark
CLK frequency	$1/t_{clk}$	57	65	70.5	MHz	
Horizontal blanking time	tHBT	176	320	376	tclk	tHBP + tHFP
Horizontal back porch	tHBP	160			tclk	
Horizontal display area	tHD	-	1024	-	tclk	
Horizontal front porch	tHFP	16	160	216	tclk	
Horizontal period	tH	1200	1344	1400	tclk	
Horizontal pulse width	tHPW	1	2	140	tclk	
Vertical blanking time	tVBT	24	38	72	tH	tVBP + tVFP
Vertical back porch	tVBP	23			tH	
Vertical display area	tVD		768		tH	
Vertical front porch	tVFP	1	15	49	tH	
Vertical period	tV	792	806	840	tH	
Vertical pulse width	tVPW	1	2	20	tH	
Frame Rate	F	-	60	-	HZ	

Table 5.1 Timing table

5.2 LVDS data input format 8-bit mode data input



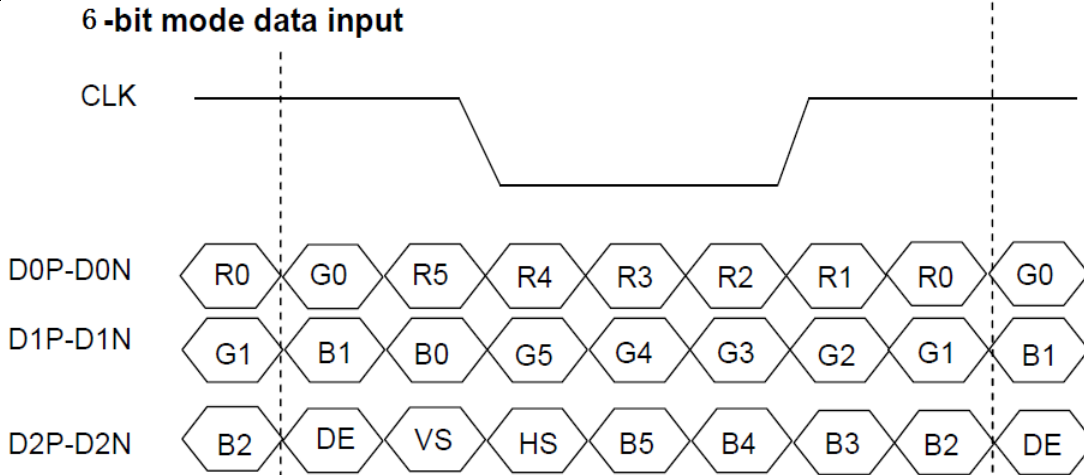


Figure 5.2 LVDS data input format(VESA Standard)

5.3 Power on/off sequence

Item	Symbol	Min	Typ	Max	Unit	Remark
VCC on to VCC stable	TP1	0.5	-	20	ms	
VCC stable to signal on	TP2	1	-	-	ms	
Signal on to LED on	TP3	200	-	-	ms	
VDD off time	TP4	0	-	10	ms	
VDD off to next VDD on	TP5	500	-	-	ms	
Signal off before VDD off	TP6	1	-	-	ms	
LED off before signal off	TP7	200	-	-	ms	

Table 5.3 Power on/off sequence

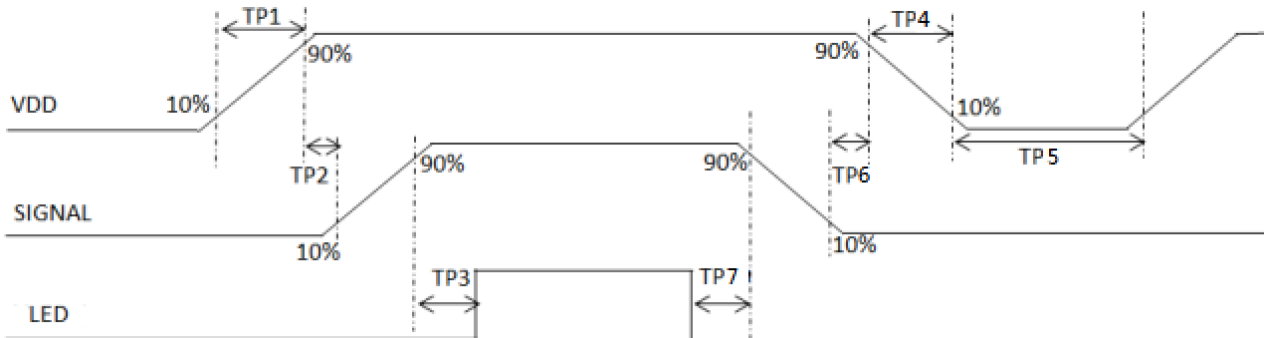


Figure 5.3 Power on/off sequence

6 Optical Characteristics

Ta=25°C

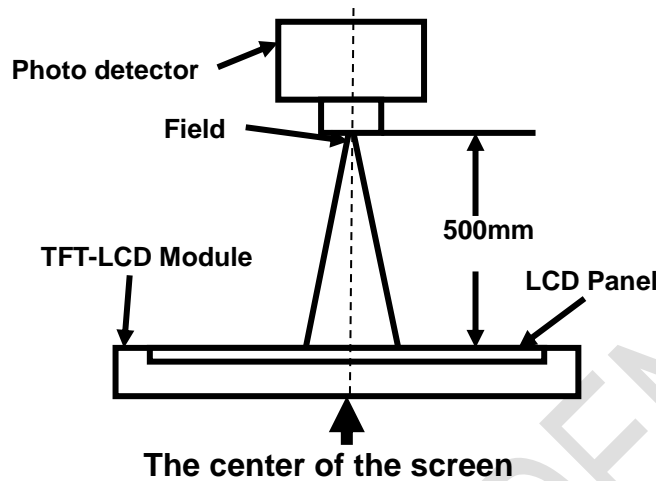
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles	θT	$CR \geq 10$	75	85	-	Degree	Note2,3
	θB		75	85	-		
	θL		75	85	-		
	θR		75	85	-		
Contrast Ratio	CR	$\theta=0^\circ$	800	1000	-		Note 3
Response Time	T_{ON}	25°C	-	35	50	ms	Note 4
	T_{OFF}						
Chromaticity	White	x	Backlight is on	0.263	0.313	0.363	Note 1,5
		y		0.279	0.329	0.379	
	Red	x		TBD	TBD	TBD	Note 1,5
		y		TBD	TBD	TBD	
	Green	x		TBD	TBD	TBD	Note 1,5
		y		TBD	TBD	TBD	
	Blue	x		TBD	TBD	TBD	Note 1,5
		y		TBD	TBD	TBD	
Uniformity	U		75	85		%	Note 6
NTSC			45	50		%	Note 5
Luminance	L		1150	1300		cd/m ²	Note 7

Test Conditions:

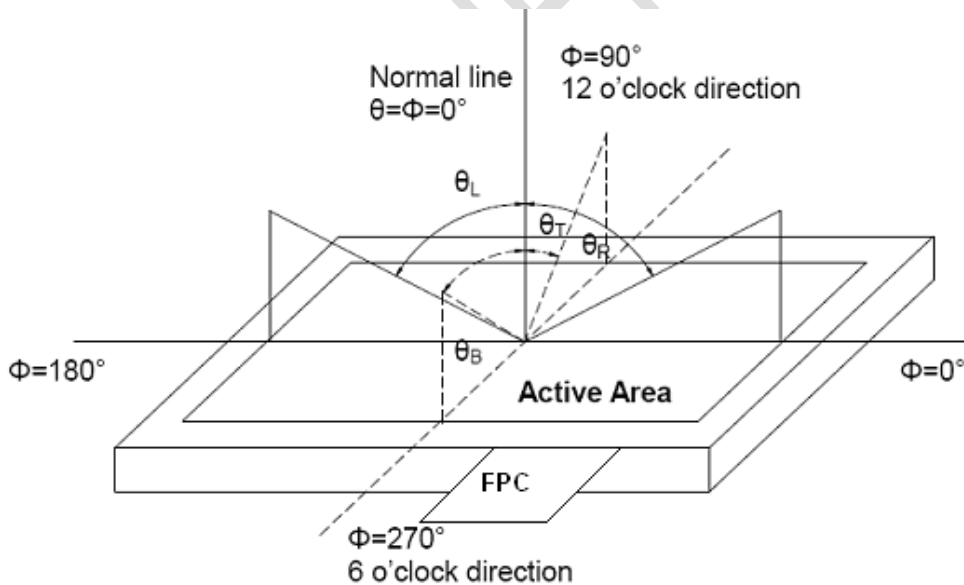
1. $I_F = 120$ mA (for each LED), and the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.

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.



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 V_{white} .

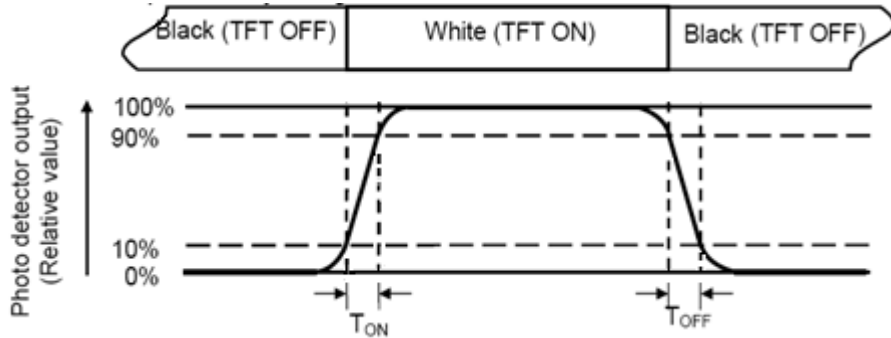
“Black state”: The state is that the LCD should drive by V_{black} .

V_{white} : To be determined V_{black} : To be determined.

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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)

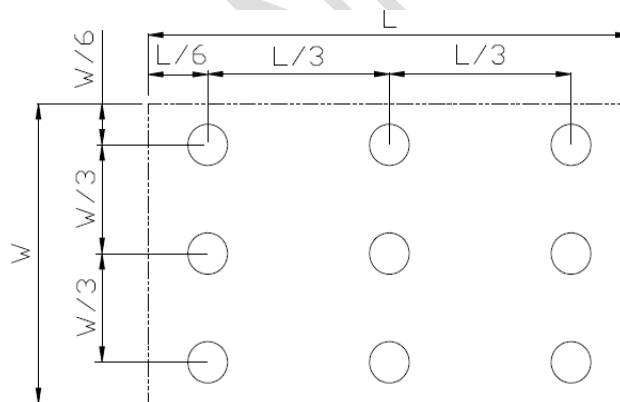
Color coordinates measured at center point of LCD.

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.

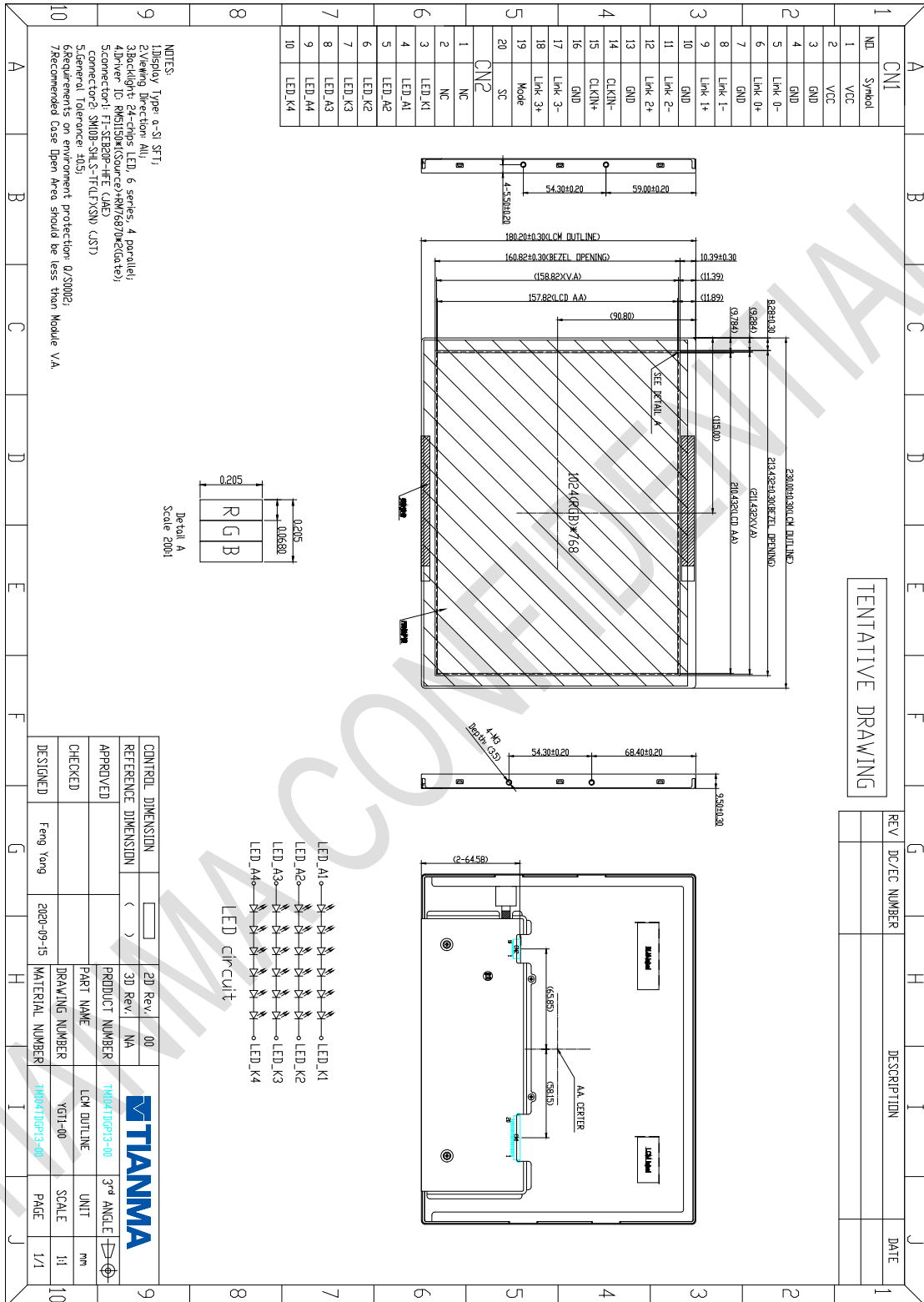
7 Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ta = +80°C, 500 hours	IEC60068-2-1 GB2423.2
2	Low Temperature Operation	Ta = -30°C, 500 hours	IEC60068-2-1 GB2423.1
3	High Temperature Storage	Ta = +85°C, 500 hours	IEC60068-2-1 GB2423.2
4	Low Temperature Storage	Ta = -40°C, 500 hours	IEC60068-2-1 GB2423.1
5	High Temperature and Humidity Operation	Ta = +60°C, 90% RH max, 500 hours	IEC60068-2-78 GB/T2423.3
6	Thermal Shock (non-operation)	-40°C 30 min ~ +85°C 30 min, Change time: 5min, 100 Cycle	Start with cold temperature, End with high temperature, IEC60068-2-14, GB2423.22
7	ESD	C=150pF, R=330Ω, 5point/panel Air: ±15Kv, 5times; Contact: ±8Kv, 5times (Environment: 15°C ~ 35°C, 30% ~ 60% RH, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2
8	Vibration Test (non-operation)	Vibration level: 66.64m/s ² (6.8G) Waveform: sinusoidal Frequency range: 20~500Hz Frequency sweep rate: 0.5 octave/min Duration: one sweep from 20 to 500Hz in each of three mutually perpendicular axes (each x, y, z axis: 1 hour, total 3hrs)	GB/T 2423.10-2008 ; GB/T 2423.56-2006
9	Shock Test	Shock level: 1470m/s ² (150G) Waveform: half sinusoidal wave, 2ms Number of shocks: one shock input in each direction of three mutually perpendicular axes for a total of six shock inputs	GB/T 2423.5-1995
10	Package Drop Test	Height: 60cm, 1 corner, 3 edges, 6 surfaces	GB/T 4857.5-1992
11	Package Vibration	Frequency : 5-20-200HZ , PSD : 0.01-0.01-0.001 Total: 0.781g ² /HZ, x/y/z axis per 30min)	GB/T 4857.23-2012

Note1: Ta is the ambient temperature of sample.

Note2: 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.

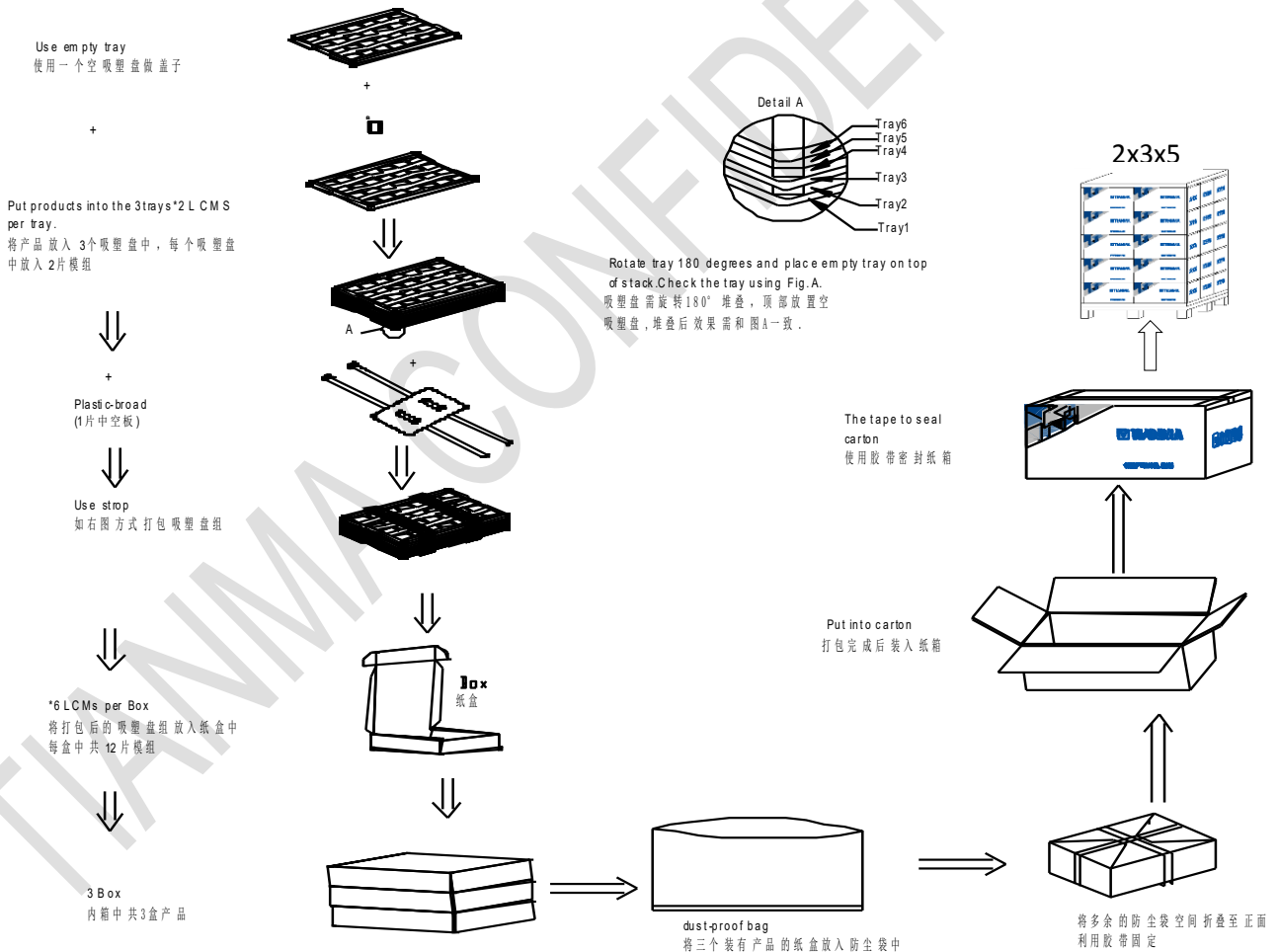
8 Mechanical Drawing



9 Packing Drawing

No	Item	Model (Materiel)	Dimensions(mm)	Unit Weight(Kg)	Quantity
1	LCM Module	TM104TDGPXX-00	230.00×180.2×9.5	TBD	18
2	Tray	PET(Transmit)	485x330x21.5	0.215	12
3	Dust-Proof Bag	PE	235mm x 150m x 0.05	---	1
4	Box	Corrugated paper	520×345×74	0.388	3
5	Carton	Corrugated paper	544x365x250	1.01	1
6	Plastic Board	PE	485×330×5	0.05	3
7	Total Weight	TBD			

Note: LCM quantity per tray: 2 pcs. Total LCM quantity in Carton: 2x 9=18 pcs



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

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.

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