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Datasheet

Tianma

P1060WXF1MA00

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MODEL NO : P1060WXF1MA00

MODEL VERSION: XX

SPEC VERSION : XX

ISSUED DATE: 2020-10-20

■**Preliminary Specification**
□**Final Product Specification**

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Customer :

Approved by	Notes

TIANMA Confirmed :

Prepared by	Checked by	Approved by
Sheng Guo	Zhijie Song	

This technical specification is subjected to change without notice

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Record of Revision

Rev	Issued Date	Description	Editor
1.0	2020-09-17	Preliminary Specification Release.	Sheng Guo
1.1	2020-10-20	Change ① and ③ in MSL terminal from Low to Low or open.Update drawings at the same time.	Sheng Guo

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1. General Specifications

Feature		Spec
Display Spec.	Size	10.6 inch
	Resolution	1280(RGB) x 768
	Technology Type	a-Si
	Pixel Configuration	R.G.B. Vertical Stripe
	Pixel pitch(mm)	0.18 (H) × 0.18 (V) mm
	Display Mode	Normally Black
	Surface Treatment	Clear
	Viewing Direction	All
Mechanical Characteristics	LCM (W x H x D) (mm)	250.0(W)*157.0(H)*8.9(D)
	Active Area(mm)	230.4*138.24mm
	With /Without TSP	Without TSP
	Connection Type	LCM:FI-SE20P-HFE(JAE) BL:SM10B-SHLS-TF(LF)(SN)(JST)
	LED Numbers	32 LEDs
	Weight (g)	TBD
Electrical Characteristics	Interface	1port 4pair LVDS, 6/8bit selectable
	Color Depth	16.7M/262K
	Driver IC	NT39413TH-D/4EC * 4 + HX8695-B00BPD400-B * 1

Note 1: Requirements on Environmental Protection: Q/S0002+HF

Note 2: LCM weight tolerance: ± 5%

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2. Input/Output Terminals

2.1 Pin assignment (TFT Interface)

CN1（Interface Signal）

Used connector: FI-SE20P-HEF（JAE）

Corresponding connector: FI-S20S[for discrete Wire], FI-SE20ME[for FPC](JAE)

No	Symbol	Description	Remarks
1	VCC	Power supply for LCD	Note1
2	VCC	Power supply for LCD	
3	MSL	Selection of LVDS input map	Note1
4	GND	Ground	
5	Link 0-	LVDS pixel data input 0-	Note2
6	Link 0+	LVDS pixel data input 0+	
7	GND	Ground	
8	Link 1-	LVDS pixel data input 1-	Note2
9	Link 1+	LVDS pixel data input 1+	
10	GND	Ground	
11	Link 2-	LVDS pixel data input 2-	Note2
12	Link 2+	LVDS pixel data input 2+	
13	GND	Ground	
14	CLKIN-	LVDS pixel clock input -	Note2
15	CLKIN+	LVDS pixel clock input +	
16	GND	Ground	
17	Link 3-	LVDS pixel data input 3-	Note2
18	Link 3+	LVDS pixel data input 3+	
19	MODE	=High 8 bit; =Low 6 bit;	Note3
20	SC	Selection of scan direction	Note4

Note 1: ALL GND, VCC terminals should be used without any non-connected lines.
Note 2: Also referred to as: D0+/-, D1+/-, D2+/-, D3+/- and CLK+/-. Twist pair wires with 100Ω （Characteristic impedance）should be used between LCD panel signal processing board and LVDS transmitter.
Note3: See “ 5.3 DISPLAY COLORS AND INPUT DATA SIGNALS”.
Note4: See “5.5 SCANNING DIRECTIONS”.

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2.2 Pin assignment (backlight Interface)

Backlight-side connector: SM10B-SHLS-TF(LF)(SN)(JST)

Corresponding connector: SHLP-10V-S-B(JST)

No	Symbol	Description
1	NC	This pin should be open
2	NC	This pin should be open
3	C1	LED Cathode 1
4	A1	LED Anode 1
5	A2	LED Anode 2
6	C2	LED Cathode 2
7	C3	LED Cathode 3
8	A3	LED Anode 3
9	A4	LED Anode 4
10	C4	LED Cathode 4

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3 Absolute Maximum Ratings

Item		Symbol	Min	Max	Unit	Remark
Power supply voltage		VCC	-0.3	4	V	-
Input voltage for signals	Display signals Note 1	VD	-0.3	VCC+0.3	V	
	Function signals Note 2	VF				
Operating Temperature		T_{OPR}	-30	80	℃	-
Storage Temperature		T_{STG}	-30	80	℃	-
Relative Humidity Note3		RH	--	≤95	%	Ta≤40℃
			--	≤85	%	40℃＜Ta≤50℃
			--	≤55	%	50℃＜Ta≤60℃
			--	≤36	%	60℃＜Ta≤70℃
Absolute Humidity Note 3		AH	--	≤70 Note4	g/m³	Ta＞70℃

Note1: D0+/-, D1+/-, D2+/-, D3+/- and CLK+/-
Note2: FRC, DPS and MSL
Note3: No condensation
Note4：Water amount at Ta= 70°C and RH= 36%,

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4 Electrical Characteristics

4.1 Driving TFT LCD Panel

(GND=0V, Ta=25℃)

Parameter		Symbol	min.	typ.	max.	Unit	Remarks
Power supply voltage		VCC	3.0	3.3	3.6	V	-
Power supply current		ICC	-	TBD Note1	TBD Note2	mA	at VCC= 3.3V
Permissible ripple voltage		VRPC	-	-	100	mVp-p	for VCC
Differential input threshold voltage	High	VTH	-	-	+100	mV	at VCM= 1.2V Note3
	Low	VTL	-100	-	-	mV	
Terminating resistance		RT	-	100	-	Ω	-
Input voltage for MODE and SC signals	High	VFH	0.7VCC	-	VCC	V	CMOS level
	Low	VFL	0	-	0.3VCC	V	
Input current for MODE signal	High	IFH	-	-	300	μA	-
	Low	IFL	-300	-	-	μA	

Note 1: Checkered flag pattern [by EIAJ ED-2522]

Note 2: Pattern for maximum current

Note 3: Common mode voltage for LVDS receiver

4.2 LVDS Interface DC characteristic

Parameter	Symbol	Condition	Min.	Typ.	Max.	Units
Differential Input high Threshold	V_{TH}	VICM=1.2V	-	-	100	mV
Differential Input low Threshold	V_{TL}	VICM=1.2V	-100	-	-	mV
Input Differential Voltage	|VID|	-	100	400	600	mV
Differential Input Common Mode Voltage	VICM	$V_{TH/L}$ = ±100mV	0	-	2.4	V

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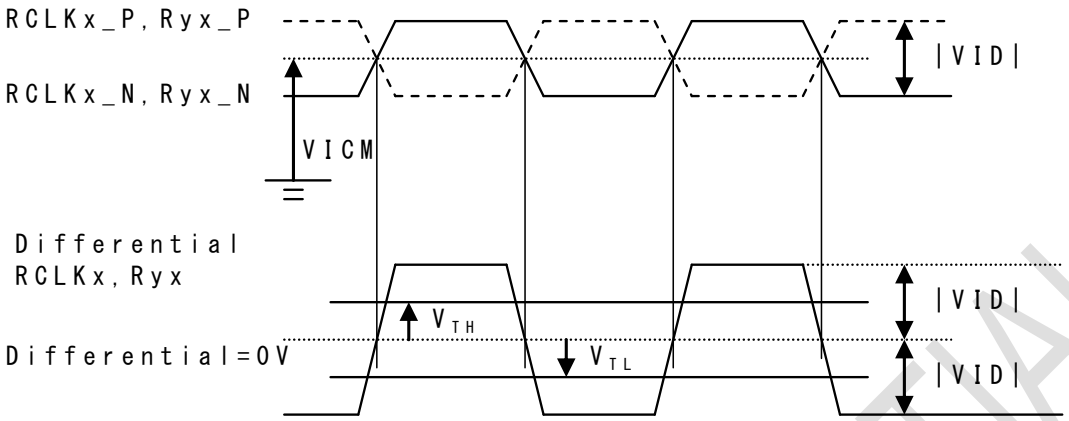

RCLKx_P, RCLKx_N：x=1, 2
Ryx_P, Ryx_N：y=A, B, C, D、 x=1, 2
|VID|=|**_P-**_N|
VICM=(**_P+**_N)/2

4.3 Fuse

Parameter	Fuse		Rating	Fusing current	Remarks
	Type	Supplier			
VCC	TBD	TBD	TBD	TBD	Note1

Note1: The power supply's rated current must be more than the fusing current. If it is less than the fusing current, the fuse may not blow in a short time, and then nasty smell, smoke and so on may occur.

4.4 Driving Backlight

Ta=25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I_{BL}	--	240	--	mA	
Forward Voltage	V_{BL}	21.6	24	25.6	V	
Power Consumption	W_{BL}	--	5.76	--	mW	
Operating Life Time	--	50000	60000	--	Hrs	

Note 1: The figure below shows the connection of backlight LED. Each LED : I=60 mA, V =3.0V.

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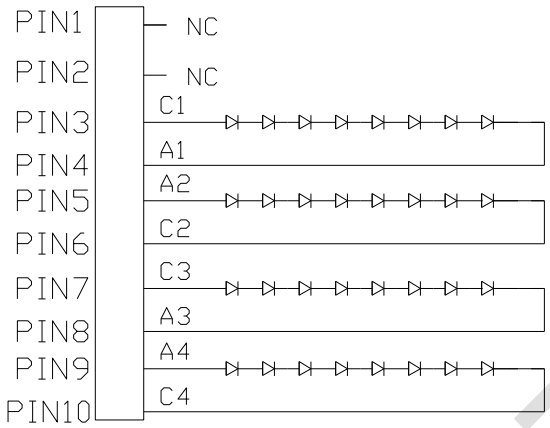
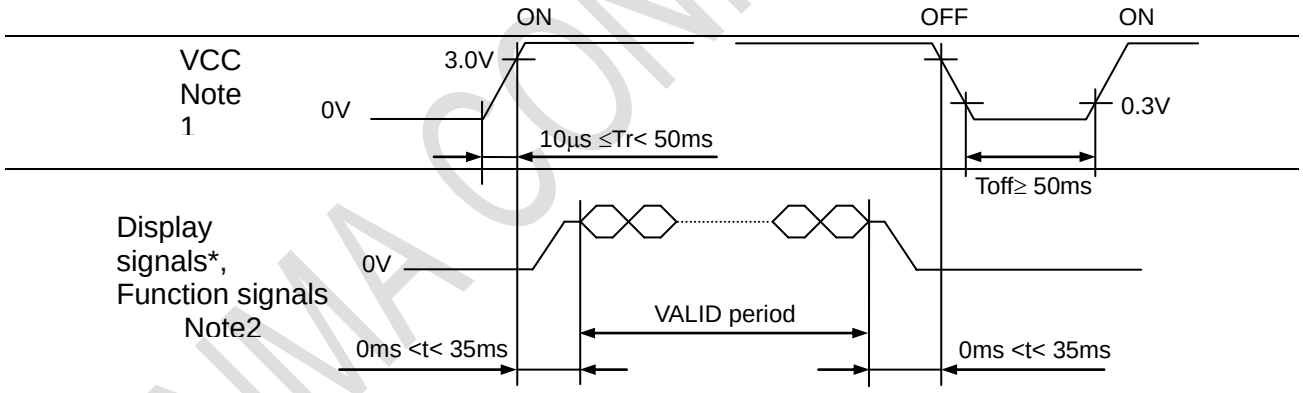


BLU-LED circuit

Note 2: IF is defined for one channel LED.Optical performance should be evaluated at Ta=25℃ 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.

4.5 POWER SUPPLY VOLTAGE SEQUENCE



* These signals should be measured at the terminal of 100Ω resistance.

Note1: If there is a voltage variation (voltage drop) at the rising edge of VCC below 3.0V, there is a possibility that a product does not work due to a protection circuit.

Note2: Display signals (Link 0+/-, Link1+/-, Link 2+/-, Link 3+/- and CLKIN+/-) and function signals (MODE,SC and MSL) must be set to Low or High-impedance, except the VALID period (See above sequence diagram), in order to avoid the circuitry damage.
If some of display and function signals of this product are cut while this product is working, even if the signal input to it once again, it might not work normally. If a customer stops the display and function signals, VCC also must be shut down.

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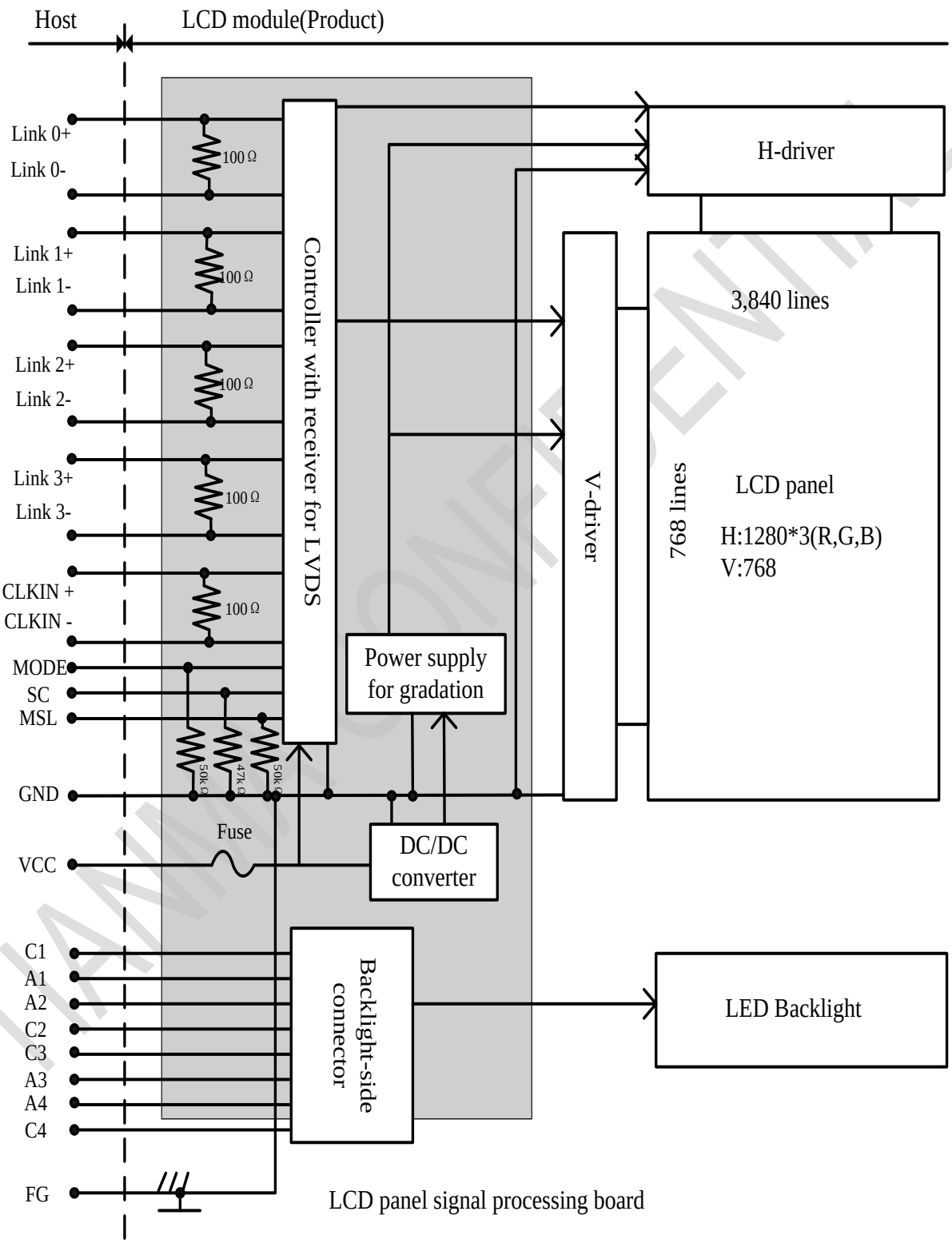
4.6 Block Diagram



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5 Timing Characteristics

5.1 Input timing

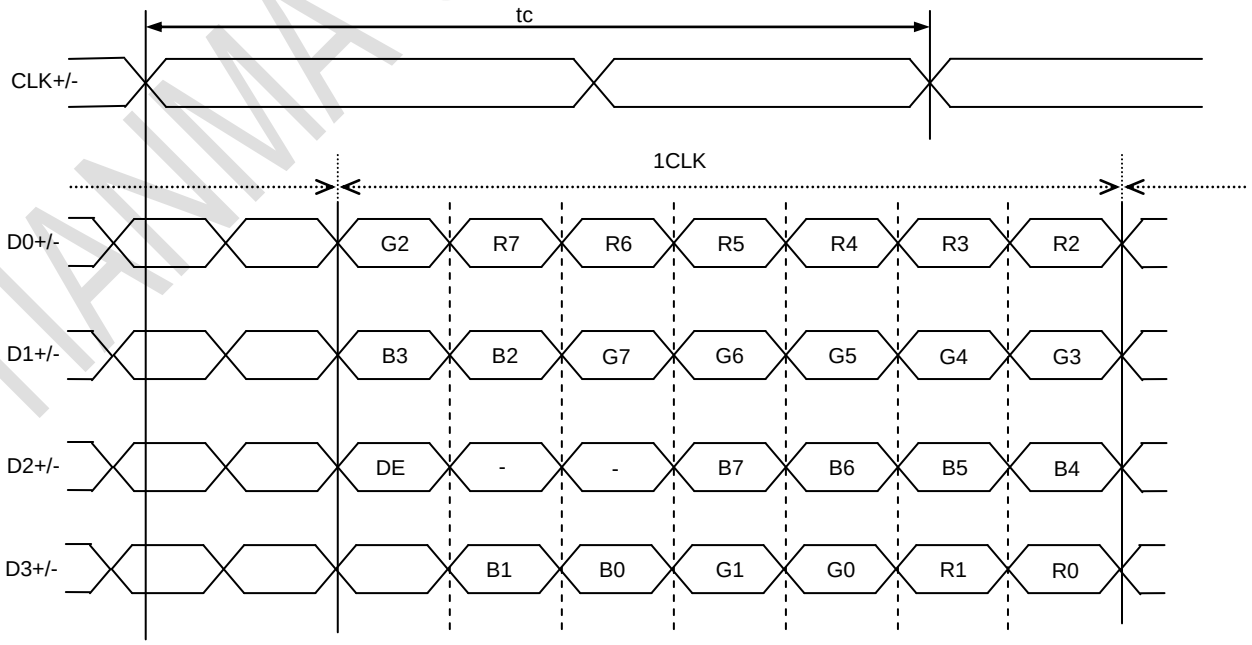
(Note1, Note2, Note3)

Parameter			Symbol	min.	typ.	max.	Unit	Remarks
CLK	Frequency		1/tc	64.5	68.25	72.0	MHz	14.652 ns (typ.)
	Duty		-	-			-	-
	Rise time, Fall time		-				ns	
DATA	CLK-DATA	Setup time	-	-			ns	-
		Hold time	-				ns	
	Rise time, Fall time		-				ns	
DE	Horizontal	Cycle	th	17.86	21.099	23.33	µs	47.396 kHz (typ.)
				-	1440	-	CLK	
		Display period	thd	1280			CLK	-
	Vertical (One frame)	Cycle	tv	14.11	16.668	17.67	ms	59.995 Hz (typ.)
				-	790	-	H	
		Display period	tvd	768			H	
	CLK-DE	Setup time	-	-			ns	-
		Hold time	-				ns	
	Rise time, Fall time		-				ns	

Note1: Definition of parameters is as follows.
tc= 1CLK, th= 1H
Note2: See the data sheet of LVDS transmitter.
Note3: Vertical cycle (tv) should be specified in integral multiple of Horizontal cycle (th).

5.2 Input data mapping

5.2.1 Input data signal: 8bit, MAP A



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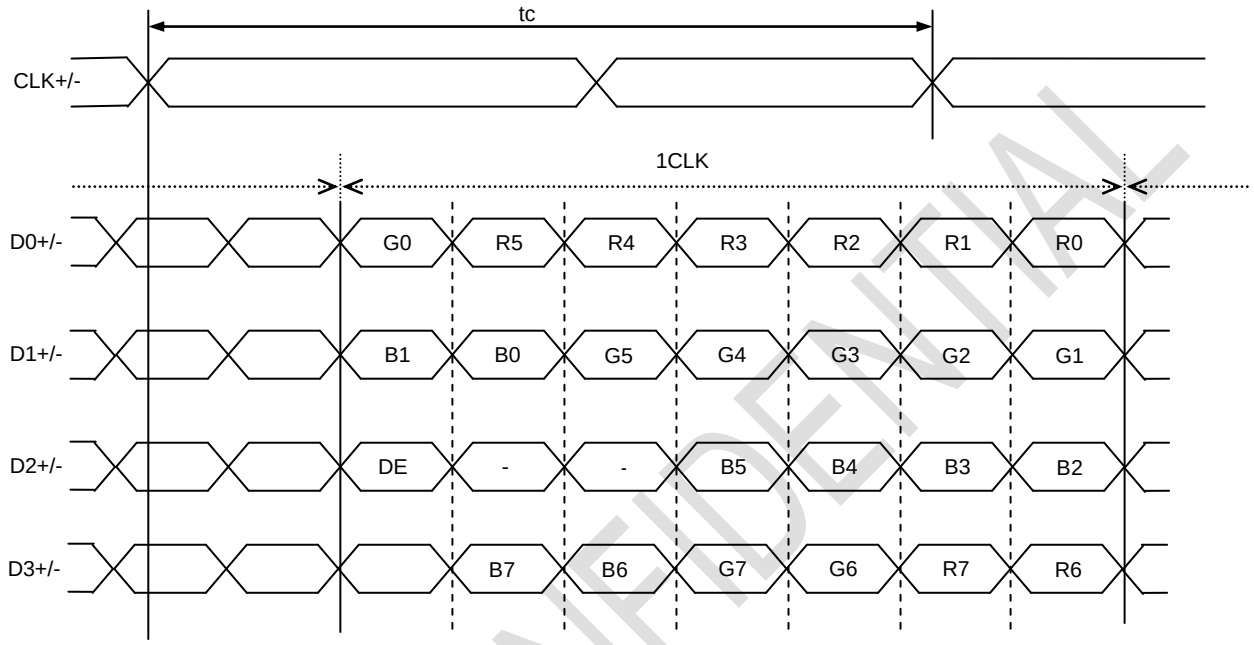
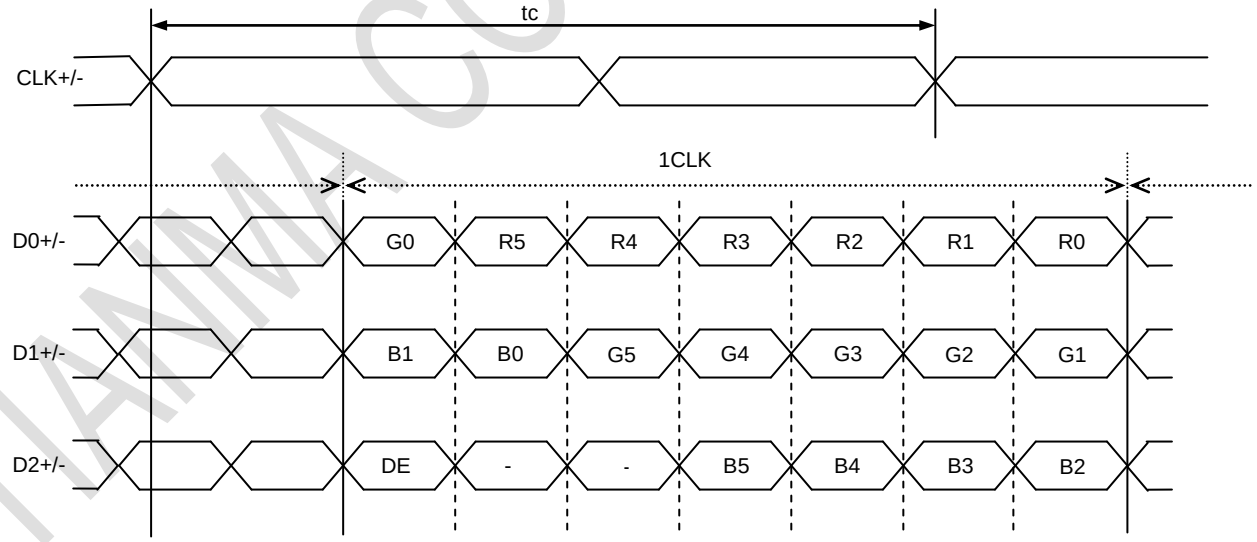
5.2.2 Input data signal: 8bit, MAP B



5.2.3 Input data signal: 6bit



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5.3 DISPLAY COLORS AND INPUT DATA SIGNALS

5.3.1 Combinations of input data signals, FRC and MSL signal

This product can display 16,777,216 colors equivalent with 256 gray scales and 262,144 colors with 64 gray scales by combination of input data signals and FRC and MSL signal. See the following table.

Combination	Input data signals	Input Data mapping	CN1- Pin No.24 and 25	MODE terminal	MSL terminal	Display colors	Remarks
①	8 bit	Map A	D3+/-	High	Low or open	16,777,216	Note1
②	8 bit	Map B	D3+/-	High	High	16,777,216	Note1
③	6 bit	-	GND	Low or open	Low or open	262,144	Note2

Note1: See "**5.3.2 16,777,216 colors**".
Note2: See "**5.3.3 262,144 colors**".

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5.3.2 16,777,216 colors

This product can display 16,777,216 colors equivalent with 256 gray scales by combination ① or ②.(See "**5.3.1 Combinations of input data signals, FRC and MSL signal**".)Also the relation between display colors and input data signals is as follows.

Display colors		Data signal (0: Low level, 1: High level)																							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Red gray scale	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	dark	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	↑					:								:								:			
	↓					:								:								:			
	bright	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green gray scale	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	↑					:								:								:			
	↓					:								:								:			
	bright	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Blue gray scale	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	↑					:								:								:			
	↓					:								:								:			
	bright	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

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5.3.3 262,144 colors

This product can display 262,144 colors with 64 gray scales by combination ③.(See "**5.3.1 Combinations of input data signals, FRC and MSL signal**".)Also the relation between display colors and input data signals is as follows.

Display colors		Data signal (0: Low level, 1: High level)																	
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Red gray scale	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	dark	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	↑				:						:						:		
	↓				:						:						:		
	bright	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Green gray scale	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	dark	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	↑				:						:						:		
	↓				:						:						:		
	bright	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0
		0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Blue gray scale	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	↑				:						:						:		
	↓				:						:						:		
	bright	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
		0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

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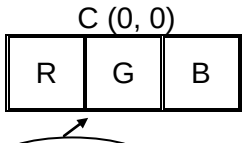
5.4 DISPLAY POSITIONS

The following table is the coordinates per pixel.



C(0, 0)	C(1, 0)	• • •	C(X, 0)	• • •	C(1278, 0)	C(1279, 0)
C(0, 1)	C(1, 1)	• • •	C(X, 1)	• • •	C(1278, 1)	C(1279, 1)
• • •	• • •	• • •	• • •	• • •	• • •	• • •
C(0, Y)	C(1, Y)	• • •	C(X, Y)	• • •	C(1278, Y)	C(1279, Y)
• • •	• • •	• • •	• • •	• • •	• • •	• • •
C(0, 766)	C(1, 766)	• • •	C(X, 766)	• • •	C(1278, 766)	C(1279, 766)
C(0, 767)	C(1, 767)	• • •	C(X, 767)	• • •	C(1278, 767)	C(1279, 767)

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5.5 SCANNING DIRECTIONS

The following figures are seen from a front view.

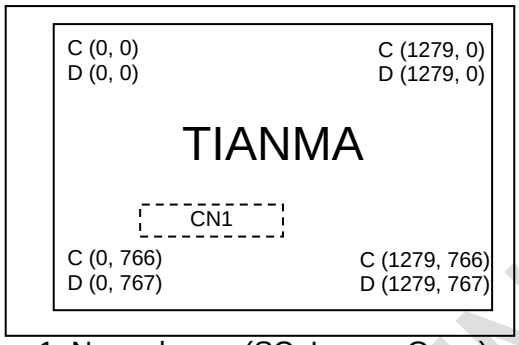

Figure1. Normal scan (SC: Low or Open)

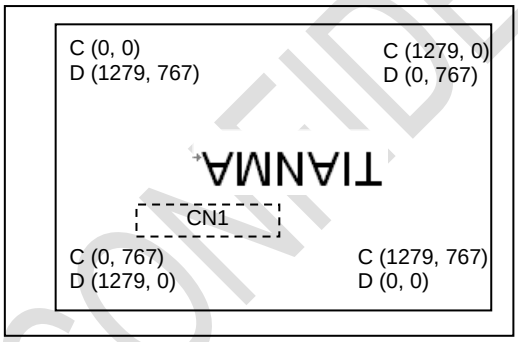

Figure2. Reverse scan (DPS:

Note1: Meaning of C (X, Y) and D (X, Y)

C (X, Y): The coordinates of the display position (See "**5.4 DISPLAY POSITIONS**".)

D (X, Y): The data number of input signal for LCD panel signal processing board

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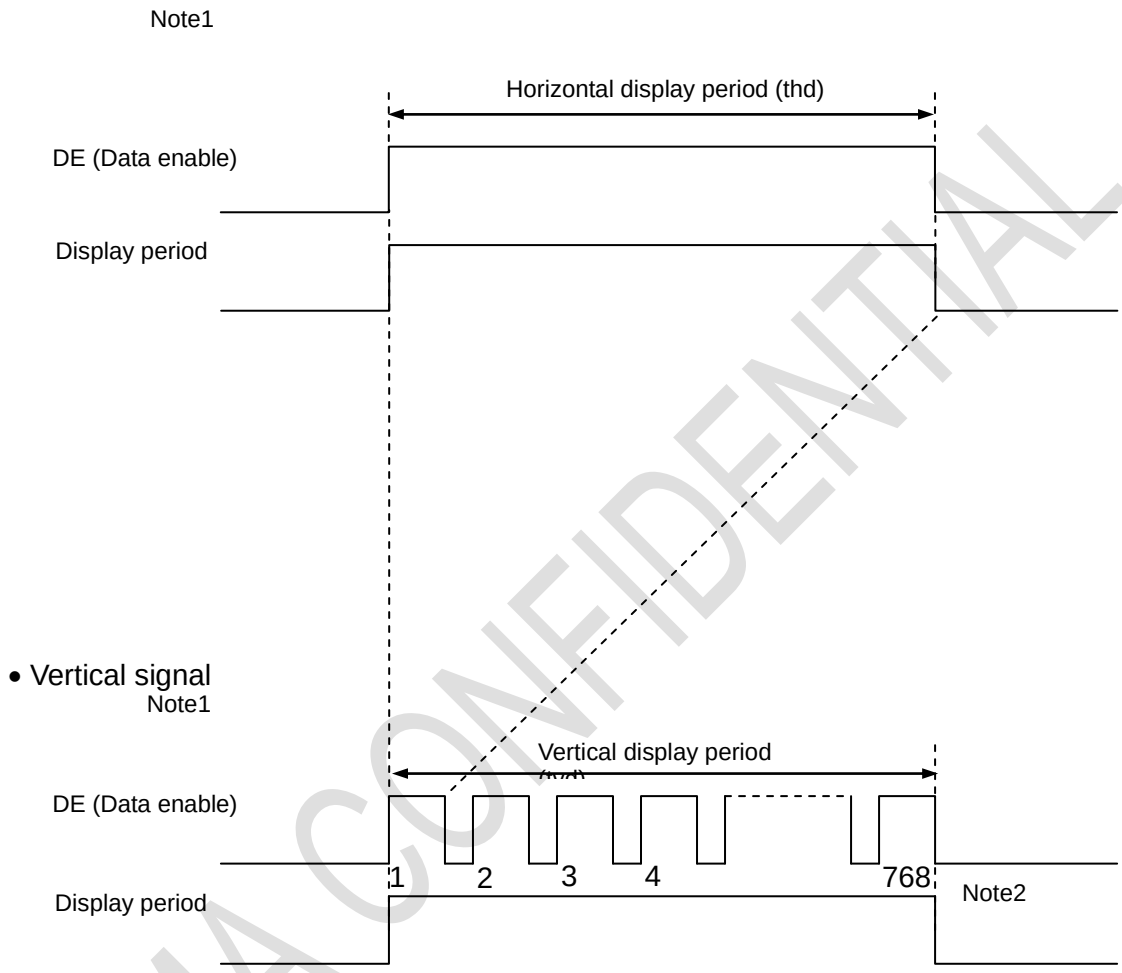
5.6 INPUT SIGNAL TIMINGS

5.6.1 Outline of input signal timings

- Horizontal signal



- Vertical signal

Note1: This diagram indicates virtual signal for set up to timing.
Note2: See "**5.6.2 Input signal timing chart**" for the pulse number.

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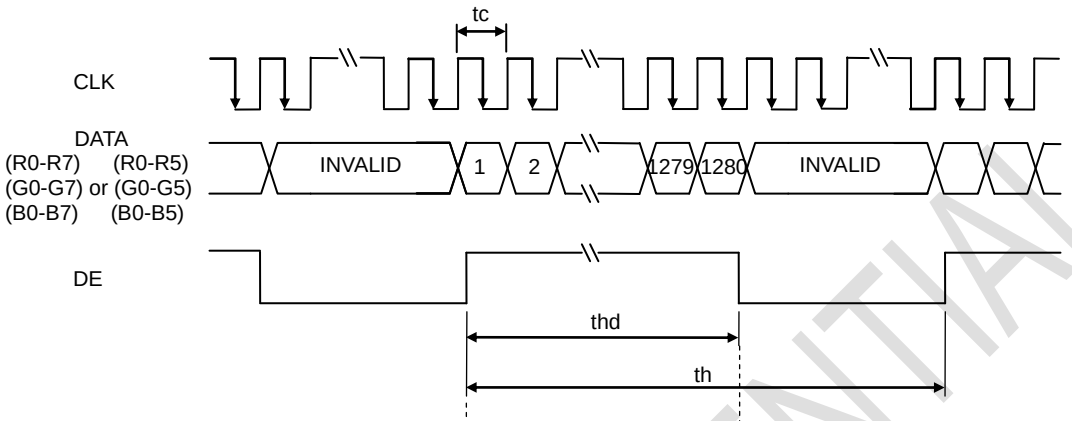
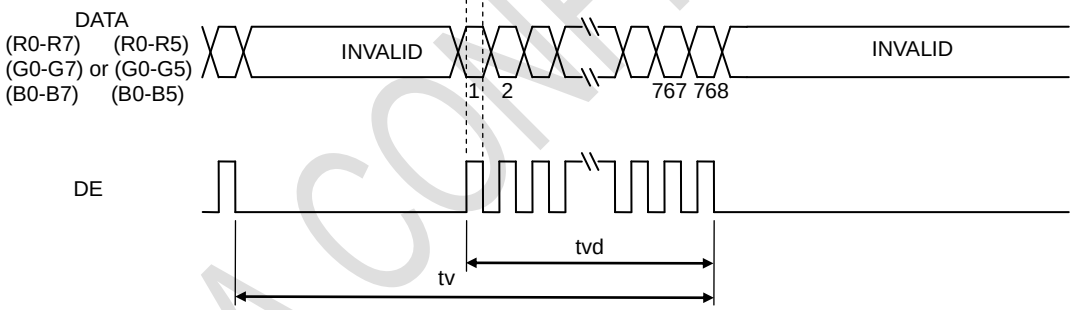
5.6.2 Input signal timing chart

Horizontal timing



Vertical timing



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6 Optical Characteristics

6.1 Optical Specification

Ta=25℃

Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
View Angles		θT	CR≧10	80	88	--	Degree	Note 2
		θB		80	88	--		
		θL		80	88	--		
		θR		80	88	--		
Contrast Ratio		CR	θ=0°	700	1000	--		Note1 Note3
Response Time		T_{ON}	25℃	--	25	40	ms	Note1 Note4
		T_{OFF}						
Chromaticity	White	x	Backlight is on	0.263	0.313	0.363		Note5, Note1
		y		0.279	0.329	0.379		
	Red	x		0.546	0.596	0.646		
		y		0.256	0.306	0.356		
	Green	x		0.255	0.305	0.355		
		y		0.502	0.552	0.602		
	Blue	x		0.100	0.150	0.200		
		y		0.046	0.096	0.146		
Uniformity		U		77	--	--	%	Note1 Note6
NTSC				45	50	--	%	Note 5
Luminance		L		800	1000	--	cd/m^2	Note1 Note7

Test Conditions:

1. I_F =60mA(LED current), the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note2.

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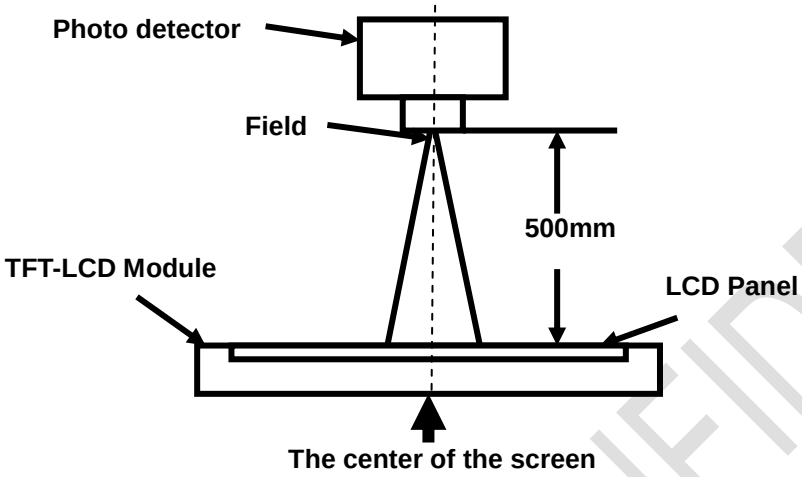
Note 1: Definition of optical measurement system.

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 EZ-Contrast。

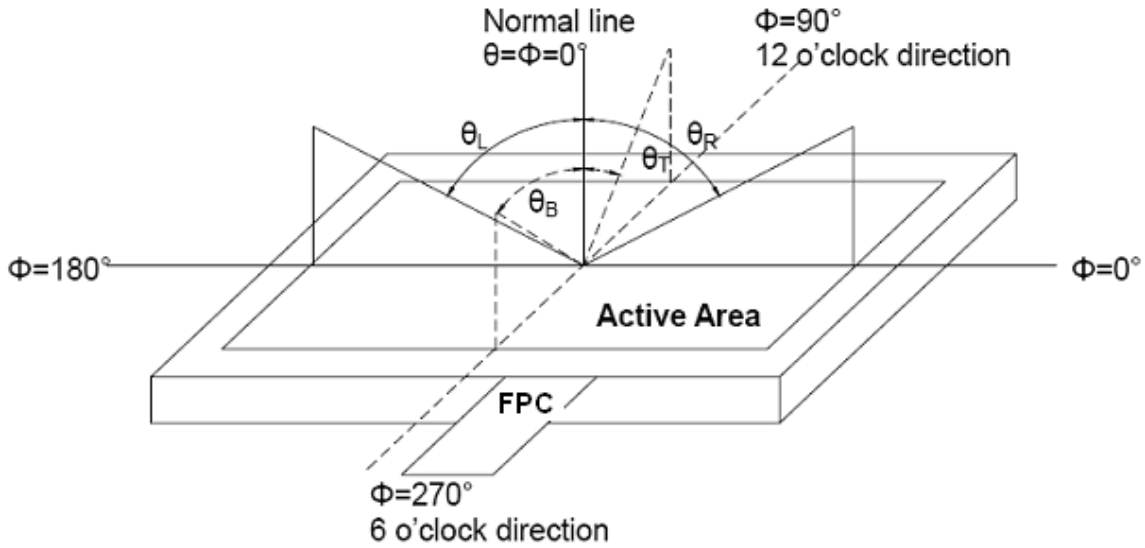


Fig. 1 Definition of viewing angle

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Note 3: Definition of contrast ratio

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

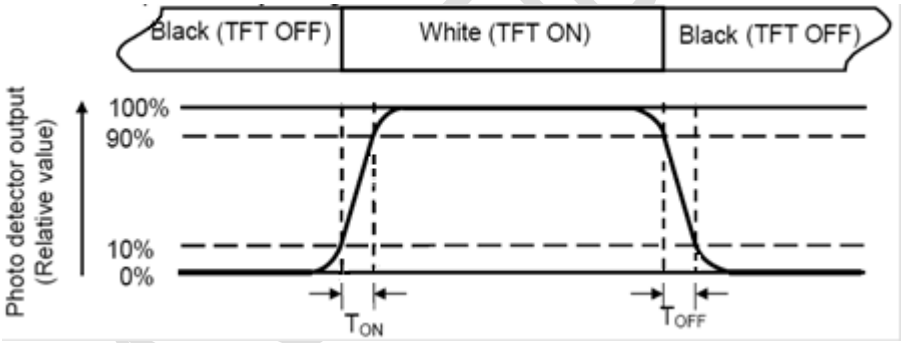
“White state “:The state is that the LCD should driven by Vwhite.

“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 10% to 90%. And fall time (TOFF) is the time between photo detector output intensity changed from 90% to 10%.



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

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Note 6: Definition of Luminance Uniformity

Active area is divided into 5 measuring areas (Refer Fig. 2). 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

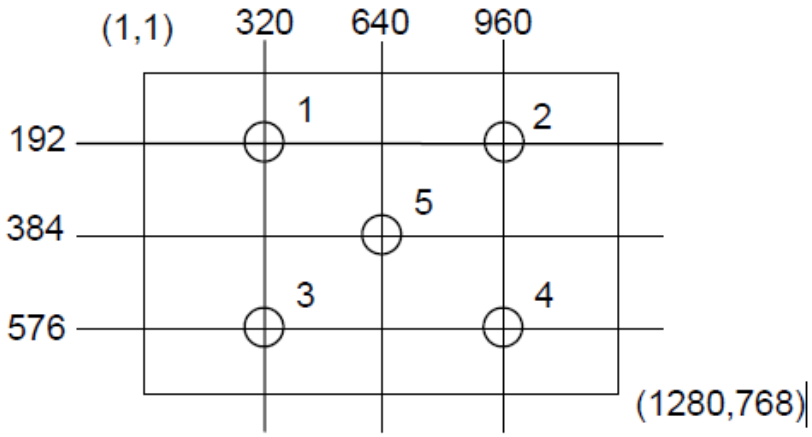

Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance :

Measure the luminance of white state at center point.

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7 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ta=+80℃, 240hrs	IEC60068-2-2:2007 GB2423.2-2008
2	Low Temperature Operation	Ta=-30℃, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta=+80℃, 240hrs	IEC60068-2-2:2007 GB2423.2-2008
4	Low Temperature Storage	Ta=-30℃, 240hrs	IEC60068-2-1:2007 GB2423.1-2008
5	Temperature & Humidity Operation	Ta=40℃, 90% RH, 240 hours	IEC60068-2-78 :2001 GB/T2423.3-2016
6	Thermal Shock (Non-operation)	-30℃ 60 min~+80℃ 60 min, Change time:5min, 100 Cycles	Start with cold temperature, End with high temperature, IEC60068-2-14:2009, GB/T 2423.22-2012
7	Electro Static Discharge (Operation)	C=150pF, R=330Ω, 9points/panel contact:±8kv, 10 times at 1 sec interval (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa)	IEC61000-4-2:2001 GB/T17626.6-2006
8	Electro Static Discharge (Non-Operation)	C=200pF, R=0Ω, Signal pin discharge , 10 times at 1 sec interval (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa)	IEC61000-4-2:2001 GB/T17626.6-2006
9	Vibration (Non-operation)	Vibration level: 9.8 m/s² (1.0G) Waveform: sinusoidal Frequency range: 5 to 500Hz Frequency sweep rate: 0.5 octave/min Duration: one sweep from 5 to 500Hz in each of three mutually perpendicular axis(each x,y,z axis:1 hour, total 3 hours)	IEC60068-2-6:1995 GB/T2423.10—2008
9	Shock (Non-operation)	Shock level: 1470m/s² (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	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height: X cm,1 corner, 3edges, 6 surfaces 注：X 根据整箱重量而定，≥10Kg 取 60cm； ＜10Kg 取 80cm	ISO 2248:1985 GB/T 4857.5-1992

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Note 1: Ta is the ambient temperature of sample.

Note 2: Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.

Note 3: 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.

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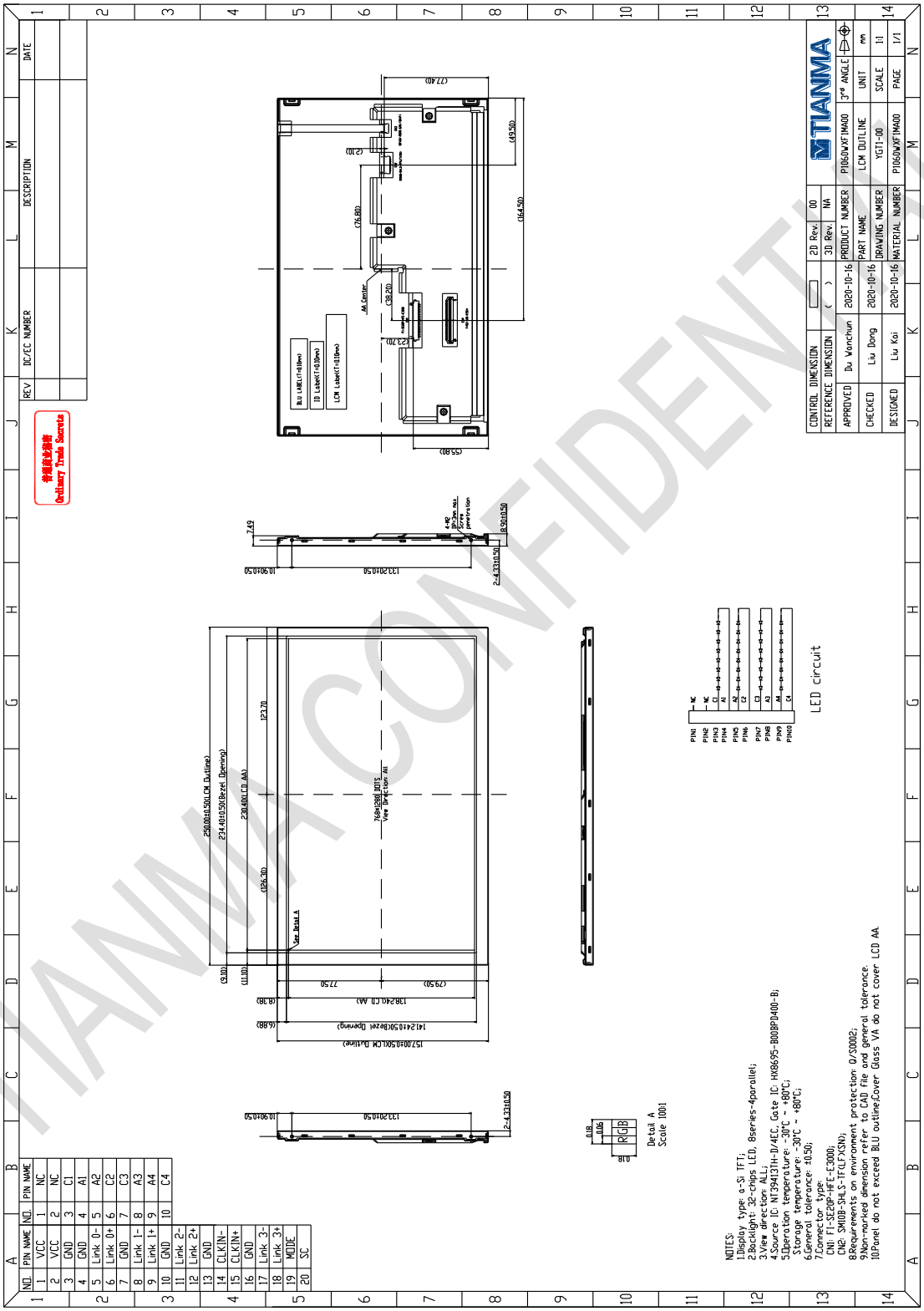
8 Mechanical Drawing



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9 Precautions For Use of LCD modules

9.1 Handling Precautions

9.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.2. 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.

9.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

9.1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

9.1.5. 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

9.1.6. Do not attempt to disassemble the LCD Module.

9.1.7. If the logic circuit power is off, do not apply the input signals.

9.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

9.1.8.1. Be sure to ground the body when handling the LCD Modules.

9.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

9.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

9.1.8.4. 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.

9.2 Storage Precautions

9.2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

9.2.2. 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%

9.2.3. The LCD modules should be stored in the room without acid, alkali and harmful gas.

9.3 Transportation Precautions

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

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Our company network supports you worldwide with offices in Germany, Austria, Switzerland, the UK and the USA. For more information please contact:

Headquarters

Germany

FORTEC Elektronik AG
Augsburger Str. 2b
82110 Germering

Phone: +49 89 894450-0
E-Mail: info@fortecag.de
Internet: www.fortecag.de

Fortec Group Members

Austria

Distec GmbH Office Vienna
Nuschinggasse 12
1230 Wien

Phone: +43 1 8673492-0
E-Mail: info@distec.de
Internet: www.distec.de

Germany

Distec GmbH
Augsburger Str. 2b
82110 Germering

Phone: +49 89 894363-0
E-Mail: info@distec.de
Internet: www.distec.de

Switzerland

ALTRAC AG
Bahnhofstraße 3
5436 Würenlos

Phone: +41 44 7446111
E-Mail: info@altrac.ch
Internet: www.altrac.ch

United Kingdom

Display Technology Ltd.
Osprey House, 1 Osprey Court
Hichingbrooke Business Park
Huntingdon, Cambridgeshire, PE29 6FN

Phone: +44 1480 411600
E-Mail: info@displaytechnology.co.uk
Internet: www. displaytechnology.co.uk

USA

Apollo Display Technologies, Corp.
87 Raynor Avenue,
Unit 1Ronkonkoma,
NY 11779

Phone: +1 631 5804360
E-Mail: info@apollodisplays.com
Internet: www.apollodisplays.com