SPECIFICATION

[ ] Preliminary Specification
[◉] Final Specification

Description **27” 1920xRGBx1080 TFT-LCD Module**

Part Number **P2700FHF1MA00**

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REVISION HISTORY

Rev	Date	Page	Revision Items	Editor
1.0	2022/08/30	-	Preliminary SPEC released.	Rong.Fan
1.1	2022/12/01	-	Update more details.	Gang.Li
1.2	2023/01/03	5	Update display direction description.	Gang.Li
1.3	2023/03/13	10,17	Add lifetime on page10. Modify optical characteristics on page17.	Gang.Li
2.0	2023/05/10	19	Update mechanical drawing, remove nameplate label. Final SPEC released.	Gang,Li
2.1	2024/9/14	-	Modify maximum operation temperature.	Gang.Li

CONTENTS

1. Summary

1.1 General Description

This is a 27.0 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. It is designed for medical diagnosis applications.

1.2 Features

- Ultra-wide viewing angle
- High luminance
- High contrast ratio
- Interface: dual port LVDS
- LED driver integrated
- Acquisition product for UL62368-1/CSA C22.2 No.62368-1-03 (File number: E170632)
- 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	27 inches	
	Resolution	1920(RGB)x1080	
	Pixel Pitch	0.3105 (H)X0.3105(V)	mm
	TFT Active Area	596.16 (H)x335.34 (V)	mm
	Technology Type	a-Si	
	Pixel Configuration	R.G.B Vertical Stripe	
	Display Mode	SFT	
	Surface Treatment	HC	
Mechanical Characteristics	LCM (W x H x D)	(630.0) (W) X(368.0) (H) X(25.0) (D) mm (typ.)	mm
	Weight	4500	g
Optical Characteristics	Luminance	1500	cd/m2
	Contrast Ratio	1000:1	
	NTSC	40	%
	Viewing Angle	88/88/88/88	degree
Electrical Characteristics	Interface	LVDS interface (2 port), 8-bit	
	Color Depth	16.7M	color
	Power Consumption	LCD:4000; Backlight:48000	mW

Table 2.1 General Specifications

3. Input / Output Terminals

3.1 CN1 Pin assignment (LCD Interface)

Connector Information	
LCD Module connector	Hirose: MDF76KBW-30S-1H(55)
Matching connector	Hirose: MDF76-30P-1C or equivalent

Table 3.1.1 Connector information

Pin No.	Symbol	Signal	Remarks
1	DA0-	Odd pixel data 0(R0~R5,G0)	
2	DA0+		
3	DA1-	Odd pixel data 1(G1~G5,B0,B1)	
4	DA1+		
5	DA2-	Odd pixel data 2(B2~B5,-,-,DE)	
6	DA2+		
7	GND	Ground	
8	CLKA-	Odd pixel clock	
9	CLKA+		
10	DA3-	Odd pixel data 3(R6~R7,G6~G7,B6~B7)	
11	DA3+		
12	DB0-	Even pixel data 0(R0~R5,G0)	
13	DB0+		
14	GND	Ground	
15	DB1-	Even pixel data 1(G1~G5,B0,B1)	
16	DB1+		
17	GND	Ground	
18	DB2-	Even pixel data 2(B2~B5,-,-,DE)	
19	DB2+		
20	CLKB-	Even pixel clock	
21	CLKB+		
22	DB3-	Even pixel data 3(R6~R7,G6~G7,B6~B7)	
23	DB3+		
24	GND	Ground	
25	GND	Ground	
26	GND	Ground	
27	GND	Ground	
28	VCC	Power supply	
29			
30			

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	
LCD Module connector	Molex: 55935-1430
Matching connector	Molex: 51382-1400 or equivalent

Table 3.2.1 Connector information

Pin No.	Symbol	Function	Description
1	NC	No connection	
2	PWM	Luminance control	PWM dimming
3	BRTC	Backlight ON/OFF control	High: Backlight ON Open or Low: Backlight OFF
4	NC	No connection	
5	GNDB	LED driver ground	Note1
6			
7			
8			
9			
10	VDD	Power supply	Note1
11			
12			
13			
14			

Table 3.2.2 Pin Assignment for Back Light Interface

3.3 Pin arrangement of socket

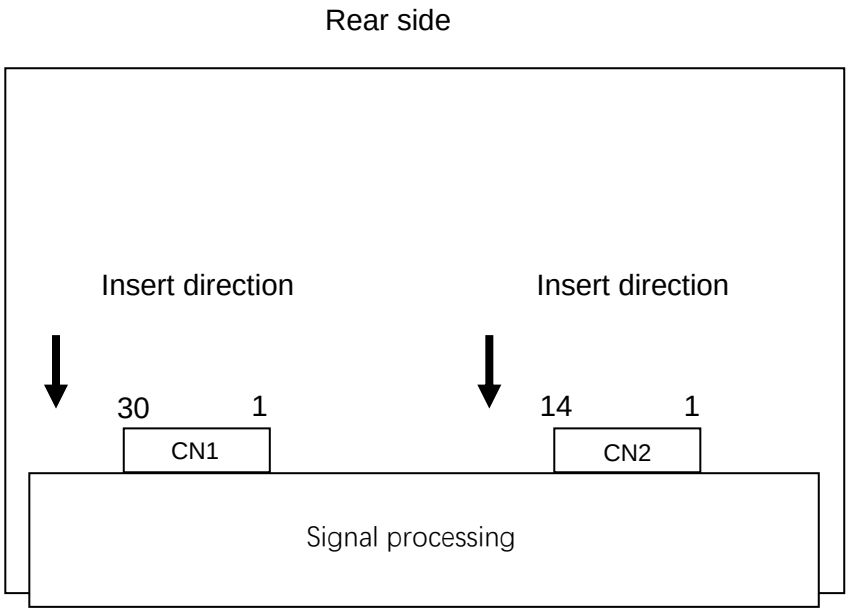
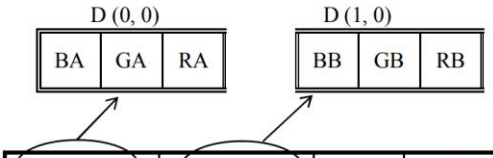


Figure 3.3.1 Pin arrangement of socket

3.4 Display direction



D(0, 0)	D(1, 0)	• • •	D(958, 0)	D(959, 0)	• • •	D(1918, 0)	D(1919, 0)
D(0, 1)	D(1, 1)	• • •	D(958, 1)	D(959, 1)	• • •	D(1918, 1)	D(1919, 1)
• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •
D(0, Y)	D(1, Y)	• • •	D(958, Y)	D(959, Y)	• • •	D(1918, Y)	D(1919, Y)
• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •
D(0, 1078)	D(1, 1078)	• • •	D(958, 1078)	D(959, 1078)	• • •	D(1918, 1078)	D(1919, 1078)
D(0, 1079)	D(1, 1079)	• • •	D(958, 1079)	D(959, 1079)	• • •	D(1918, 1079)	D(1920, 1079)

Figure 3.4.1 Pixel arrangement

Figure 3.4.2 Display direction

Note1: The pixel arrangement is BGR and display direction is shown as above when PCB on underside.

4. Absolute Maximum Ratings

Parameter			Symbol	Rating	Unit	Remarks
Power supply voltage	LCD panel signal processing board		VCC	-0.3 to +6.5	V	Ta= 25°C
	LED driver		VDD	-0.3 to +28		
Input voltage for signals	Display signals Note1		VD	-0.3 to 3.2	V	
	Function signal for LED driver	BRTC signal	BRTC	-0.3 to +5.5	V	
		PWM signal	PWM	-0.3 to +5.5	V	
Storage temperature			Tst	-30 to +80	°C	-
Operating temperature		Front surface	TopF	-30 to +70	°C	Note2
		Rear surface	TopR	-30 to +70	°C	Note3
Relative humidity Note4			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 < Ta ≤ 80°C
Absolute humidity Note4			AH	≤ 70 Note5	g/m3	Ta = 80°C

Table 4.1 Absolute maximum ratings

Note1: DA0+/-, DA1+/-, DA2+/-, DA3+/- ,CLKA+/-, DB0+/-, DB1+/-, DB2+/-, DB3+/-, CLKB+/-
Note2: Measured at T/P surface (including self-heat)
Note3: Measured at LCD module's rear shield surface (including self-heat)
Note4: No condensation
Note5: Water amount at Ta= 80°C and RH= 24%

5. Electrical Characteristics

5.1 DC Characteristics for Panel Driving

(Ta= 25°C)

Parameter			Symbol	min.	typ.	max.	Unit	Remarks
Power supply voltage			VCC	4.5	5.0	5.5	V	-
Power supply current			ICC	-	800 Note1	1100 Note2	mA	at VCC= 5.0V
Permissible ripple voltage			VRPC	-	-	100	mVp-p	for VCC Note3, Note4, Note5
Input Signal Voltage	Low		VIL	0	-	0.3xVCC	V	
	High		VIH	0.7xVCC	-	VCC	V	
Differential input threshold voltage		High	VTH	-	-	+100	mV	at VCM= 1.2V Note6, Note7
		Low	VTL	-100	-	-	mV	
Input Differential Voltage			|VID|	100	400	600	mV	-
Differential Input Common Mode Voltage			VCM	0.7	1.2	1.6	V	-
Terminating resistance			RT	-	100	-	Ω	-
LED life time			L	50000	-	-	Hrs	

Table 5.1 DC characteristics for panel driving

Note1: Checkered flag pattern [by IEC61747-6].
Note2: Pattern for maximum current.
Note3: This product works if the ripple voltage levels are over the permissible values, but there might be noise on the display image.
Note4: The permissible ripple voltage includes spike noise.
Note5: The load variation influence does not include.
Note6: Common mode voltage for LVDS receiver.
Note7: DC characteristics (LVDS receiver part).
Note8: 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 an estimated data.

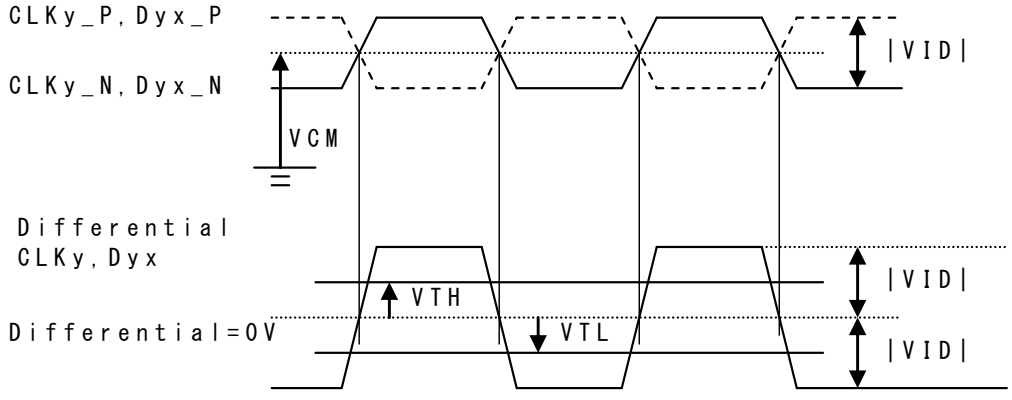


Figure 5.1 LVDS DC characteristics

5.2 DC Characteristics for Backlight Driving

(Ta= 25°C, Note1)

Parameter			Symbol	min.	typ.	max.	Unit	Remarks
Power supply voltage			VDD	22.8	24.0	25.2	V	-
Power supply current Note2			IDDB	-	2000	2150 Note3	mA	at VDD= 24.0V Note3
Permissible ripple voltage Note4			VRPB	-	-	200	mVp-p	for VDD Note4, Note5, Note6
Input voltage for signals	BRTC signal	High	VDFH1	2.0	-	5.25	V	Note7
		Low	VDFL1	0	-	0.8	V	
	PWM signal	High	VDFH2	2.0	-	5.25	V	
		Low	VDFL1	0	-	0.4	V	
PWM frequency			f_{PWM}	(100)	-	10k	Hz	Note8, Note9
PWM duty ratio			R_{PWM}	1	-	100	%	Note10, Note11
PWM pulse width			t_{PWH}	(10)	-	-	μs	

Table 5.2.1 DC characteristics for backlight driving

Note1: When designing of the power supply, take the measures for the prevention of surge voltage.
Note2: This value excludes peak current such as overshoot current.
Note3: At the maximum luminance control
Note4: The power supply lines (VDD and GND) may have ripple voltage during luminance control of LED. There is the possibility that the ripple voltage produces acoustic noise and signal wave noise in audio circuit and so on.
Note5: This product works even if the ripple voltage levels are over the permissible values, but there might be noise on the display image.
Note6: The permissible ripple voltage includes spike noise.
Note7: See "3. BLOCK DIAGRAM".
Note8: A recommended fPWM value is as follows.

$$f_{PWM} = \frac{2n-1}{4} \times fy$$

(n= integer, fy= frame frequency of LCD module)

Note9: Depending on the frequency used, some noise may appear on the screen, please conduct a thorough evaluation.
Note10: While the BRTC signal is high, do not set the tPWH (PWM pulse width) is less than minimum value. It may cause abnormal working of the backlight. In this case, turn the backlight off and then on again by BRTC signal.
Note11: Regardless of the PWM frequency, both PWM duty ratio and PWM pulse width must be always more than the minimum values.
Note12: Definition of parameters is as follows: fPWM = 1/tPW , DRPWM= tPWH/ tPW

5.3 POWER ON/OFF SEQUENCE

5.3.1 LCD panel power on/off

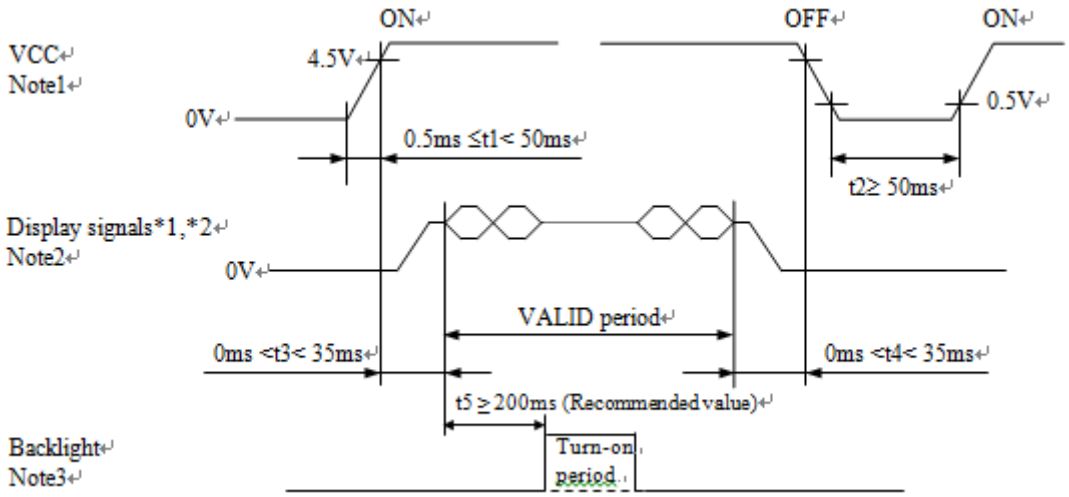


Figure 5.3.1 LCD panel power on/off

*1 DA0+/-, DA1+/-, DA2+/-, DA3+/-, CLKA+/-, DB0+/-, DB1+/-, DB2+/-, DB3+/-, CLKB+/-
*2 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 4.5V, there is a possibility that a product does not work due to a protection circuit.

Note2: Display signals (DA0+/-, DA1+/-, DA2+/-, DA3+/-,CLKA+/-,DB0+/-, DB1+/-, DB2+/-, DB3+/- and CLKB+/-) 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 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 signals, VCC also must be shut down.

Note3: In order to avoid unstable data display, the backlight is recommended to turn on within the VALID period of display and function signals.
Recommended value: t5 ≥ 200ms

5.3.2 Backlight power on/off

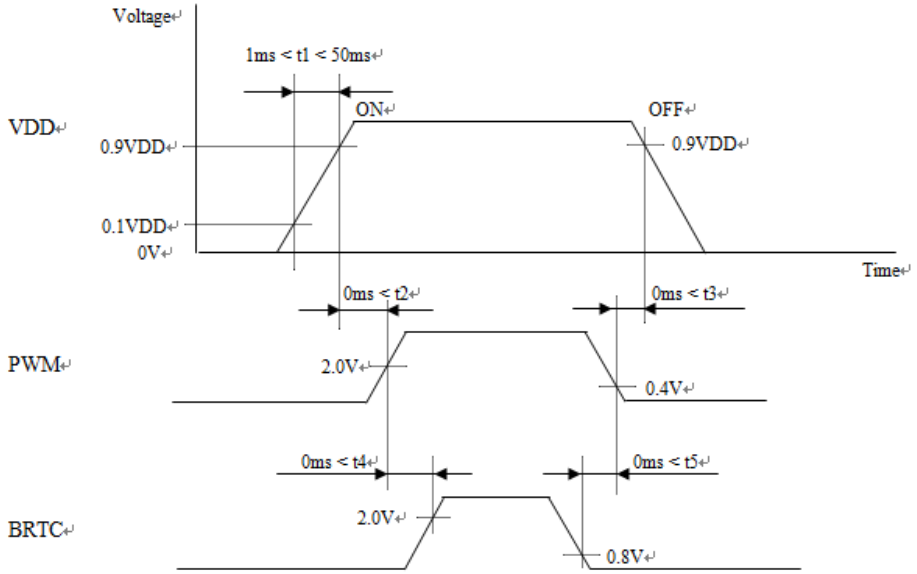


Figure 5.3.2 Backlight power on/off

5.4 LCD Module Block Diagram

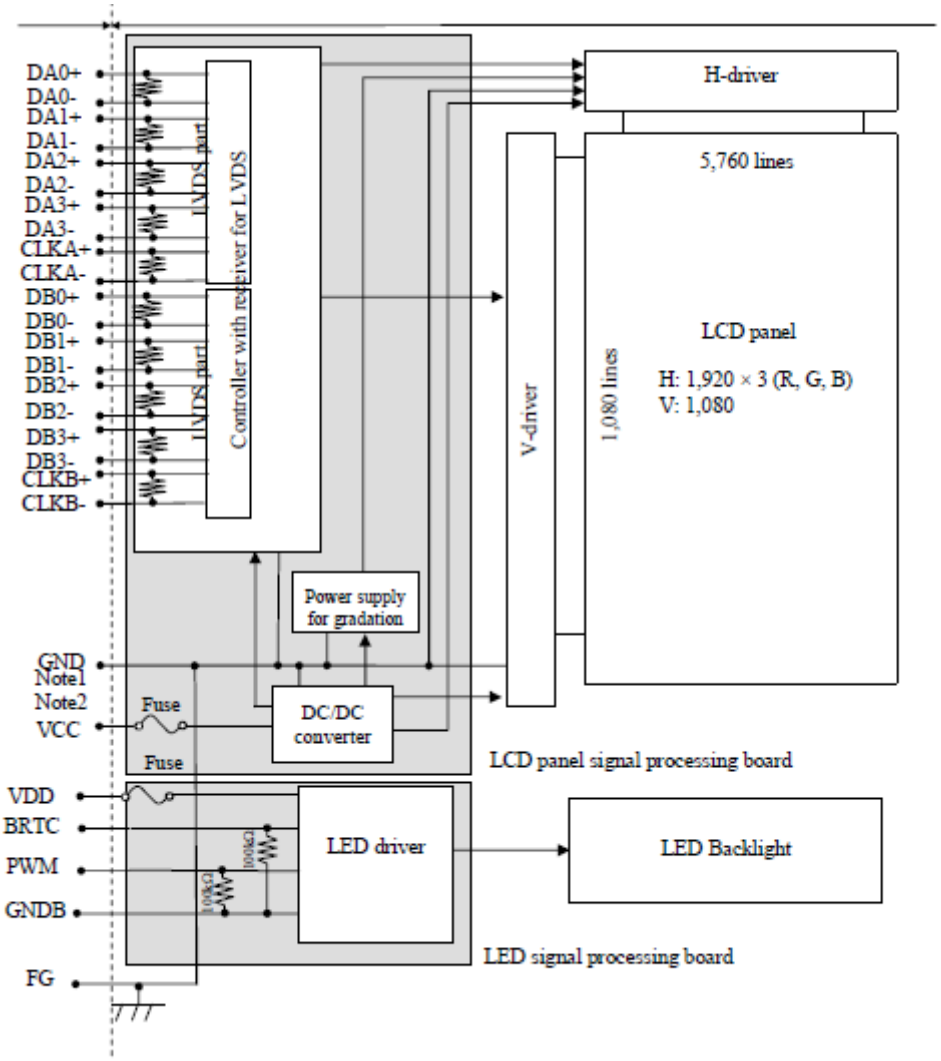


Figure 5.4.1 LCD module block diagram

Note1: Relations between GND (Signal ground), FG (Frame ground) and GNDB (LED driver ground) in the LCD module are as follows.

GND- FG	Connected
GND- GNDB	Not connected
FG- GNDB	Not connected
FG- GNDT	Not Connected

Note2: GND, FG, GNDT and GNDB must be connected to customer equipment's ground, and it is recommended that these grounds to be connected together in customer equipment.

Note3: Each pair of the LVDS signal has a 100Ωterminating resistance.

6. Interface Timing Characteristics

6.1 Timing characteristics

Parameter			Symbol	min.	typ.	max.	Unit	Remarks
CLK	Frequency		1/tc	65.0	74.175	81.5	MHz	13.48ns (typ.)
	Duty ratio		-	-			-	-
	Rise time, Fall time		-				ns	
DATA	CLK-DATA	Setup time	-	-			ns	-
		Hold time	-				ns	
	Rise time, Fall time		-				ns	
DE	Horizontal	Cycle	th	13.19	14.83	16.53	μs	67.43kHz (typ.)
				1,075	1,100	-	CLK	
		Display period	thd	960			CLK	-
	Vertical (One frame)	Cycle	tv	15.39	16.68	18.18	ms	59.94Hz (typ.)
				1,100	1,125	-	H	
		Display period	tvd	1,080			H	-
	CLK-DE	Setup time	-	-			ns	-
		Hold time	-				ns	
	Rise time, Fall time		-				ns	

Table 6.1 Timing characteristics

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).

6.2 Input signal timing chart 1

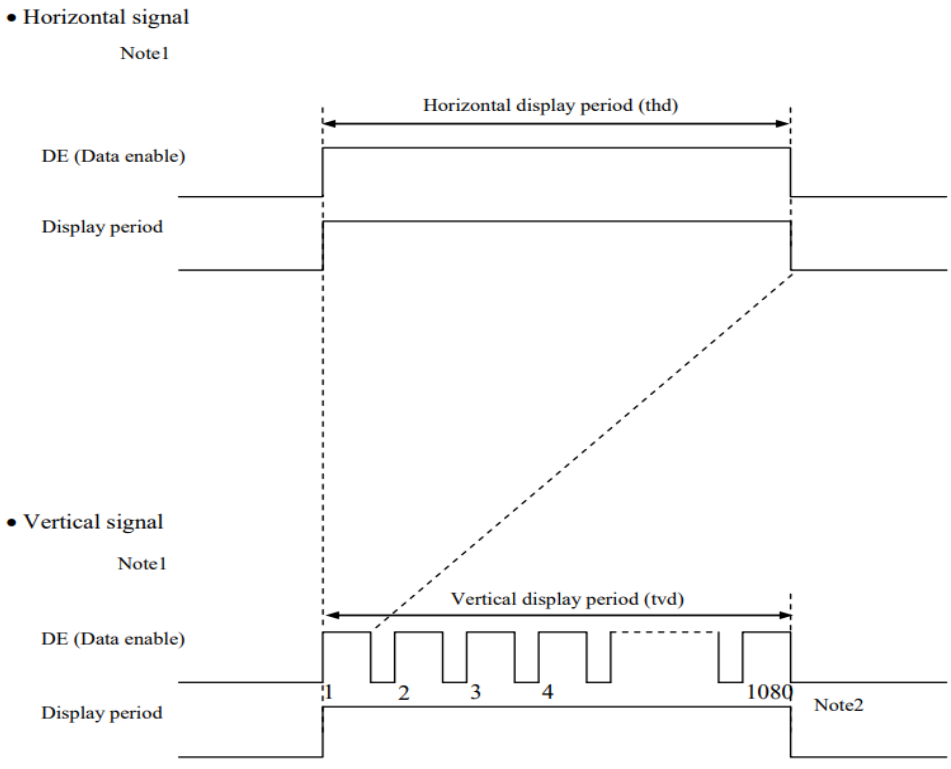


Figure 6.2 Input signal timing chart 1

Note1: This diagram indicates virtual signal for set up to timing.
Note2: See "4.8.3 Input signal timing chart" for the pulse number

6.3 Input signal timing chart 2

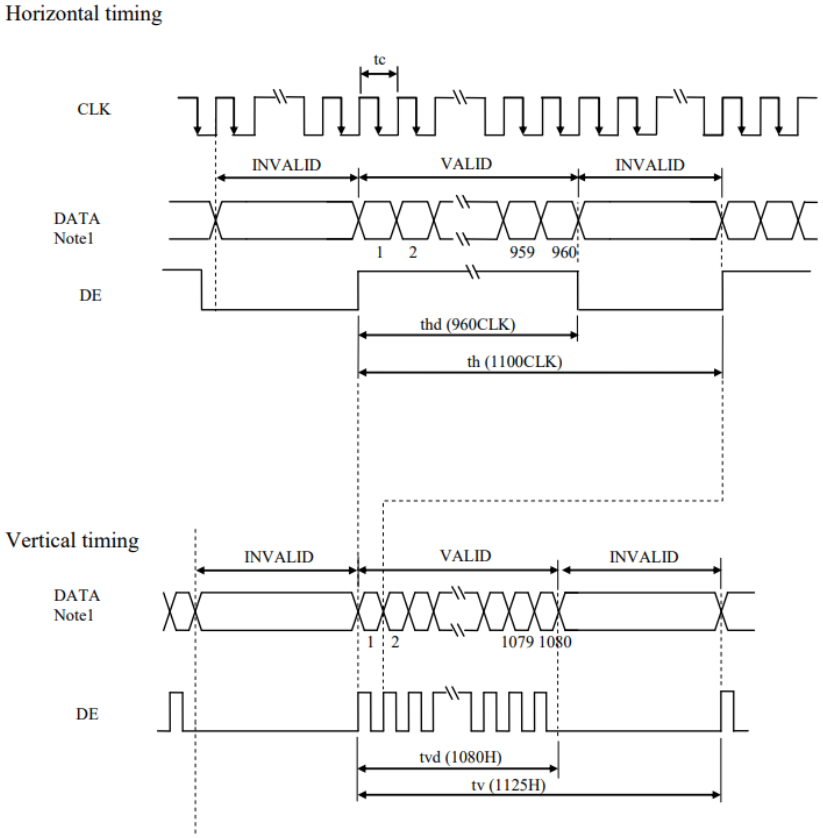


Figure 6.3 Input signal timing chart 2

Note1: DATA (A) = RA0-RA7, GA0-GA7, BA0-BA7
DATA (B) = RB0-RB7, GB0-GB7, BB0-BB7

6.4 LVDS data mapping

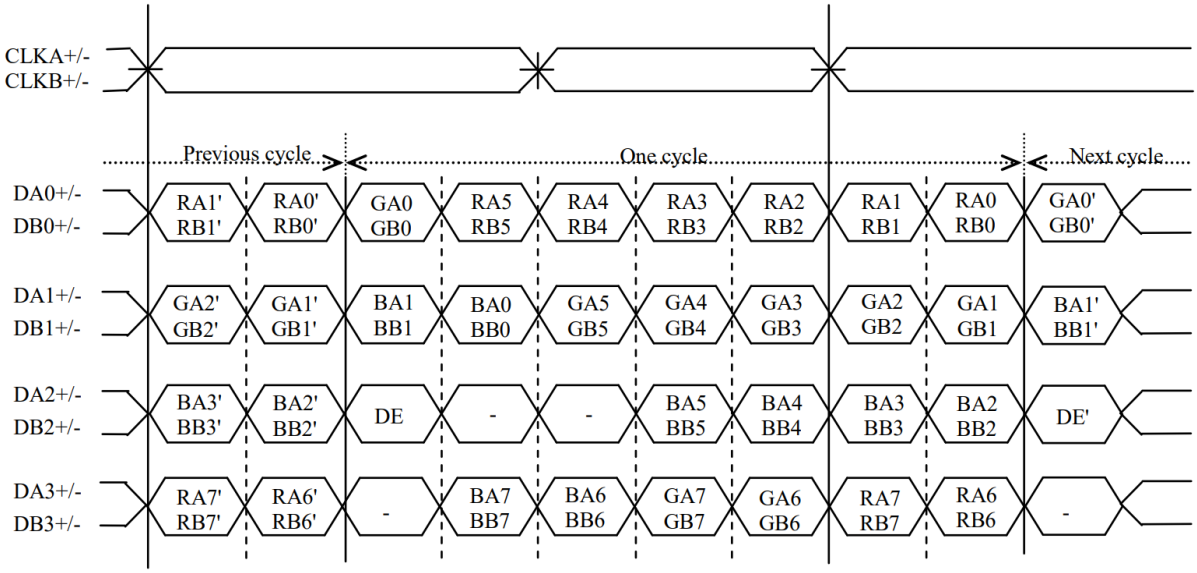


Figure 6.4 LVDS data mapping

Note1: LSB (Least Significant Bit) – R0, G0, B0 MSB (Most Significant Bit) – R7, G7, B7
Note2: Twist pair wires with 100Ω (Characteristic impedance) should be used between LCD panel signal processing board and LVDS transmitter.

6.5 LVDS Rx AC SPEC

Symbol	Parameter	min.	typ.	max.	Unit
tRCIP	CKy_+ Period	12.27	-	15.38	ns
tRCIH	CKy_+ High pulse width	-	$\frac{4}{7}t_{RCIP}$	-	ns
tRCIL	CKy_+ Low pulse width	-	$\frac{3}{7}t_{RCIP}$	-	ns
tRMG	Receiver Data Input Margin CLK= 75MHz	-0.4	-	0.4	ns
tRIP1	Input Data Position0	-| tRMG|	0.0	+| tRMG|	ns
tRIP0	Input Data Position1	$\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$\frac{t_{RCIP}}{7}$	$\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns
tRIP6	Input Data Position2	$2\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$2\frac{t_{RCIP}}{7}$	$2\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns
tRIP5	Input Data Position3	$3\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$3\frac{t_{RCIP}}{7}$	$3\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns
tRIP4	Input Data Position4	$4\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$4\frac{t_{RCIP}}{7}$	$4\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns
tRIP3	Input Data Position5	$5\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$5\frac{t_{RCIP}}{7}$	$5\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns
tRIP2	Input Data Position6	$6\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$6\frac{t_{RCIP}}{7}$	$6\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns

Table 6.5 LVDS AC specification

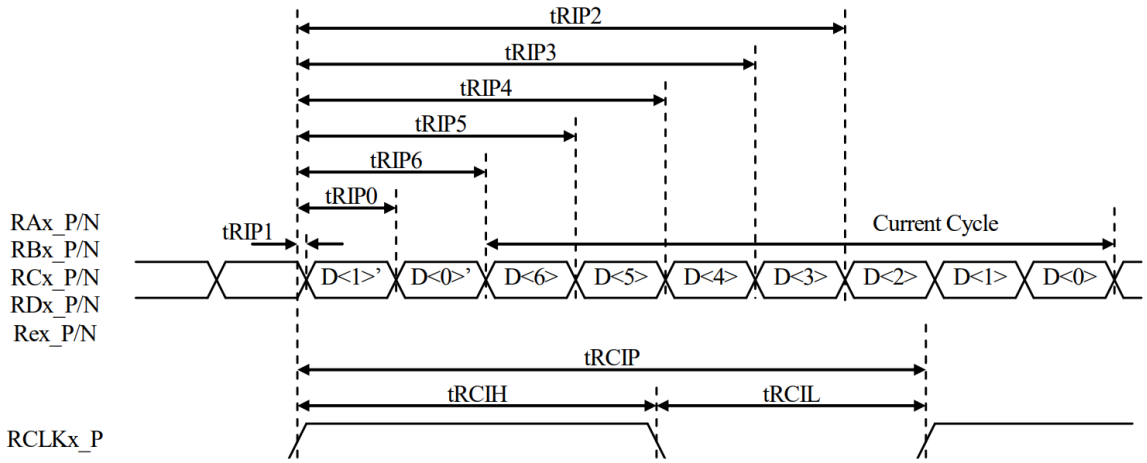


Figure 6.5 LVDS AC Specification

7. Optical Characteristics

Parameter		Condition	Symbol	min.	typ.	max.	Unit	Measuring instrument	Remarks
Luminance		White at center R= 0°, L= 0°, U= 0°, D= 0°	L	1100	1500	-	cd/m2	BM-5A or equivalent	-
Contrast ratio		White/Black at center R= 0°, L= 0°, U= 0°, D= 0°	CR	600	1000	-	-	BM-5A or equivalent	Note3
Luminance uniformity		White R= 0°, L= 0°, U= 0°, D= 0°	LU	-	1.25	1.4	-	BM-5A or equivalent	Note4
Chromaticity	White	x coordinate	Wx	0.270	0.320	0.370	-	SR-3 or equivalent	Note5
		y coordinate	Wy	0.300	0.350	0.400	-		
	Red	x coordinate	Rx	0.532	0.582	0.632	-		
		y coordinate	Ry	0.295	0.345	0.395	-		
	Green	x coordinate	Gx	0.290	0.340	0.390	-		
		y coordinate	Gy	0.510	0.560	0.610	-		
	Blue	x coordinate	Bx	0.102	0.152	0.202	-		
		y coordinate	By	0.105	0.155	0.205	-		
Color gamut		R= 0°, L= 0°, U= 0°, D= 0° at center, against NTSC color space	C	36	40	-	%		
Response time		Black to white	$T_{on}+T_{off}$	-	25	40	ms	BM-5A or equivalent	Note6 Note7
Viewing angle	Right	U= 0°, D= 0°, CR≥ 10	R	70	88	-	°	EZ Contrast	Note8
	Left	U= 0°, D= 0°, CR≥ 10	L	70	88	-	°		
	Up	R= 0°, L= 0°, CR≥ 10	U	70	88	-	°		
	Down	R= 0°, L= 0°, CR≥ 10	D	70	88	-	°		

Table 7.1 Optical characteristics

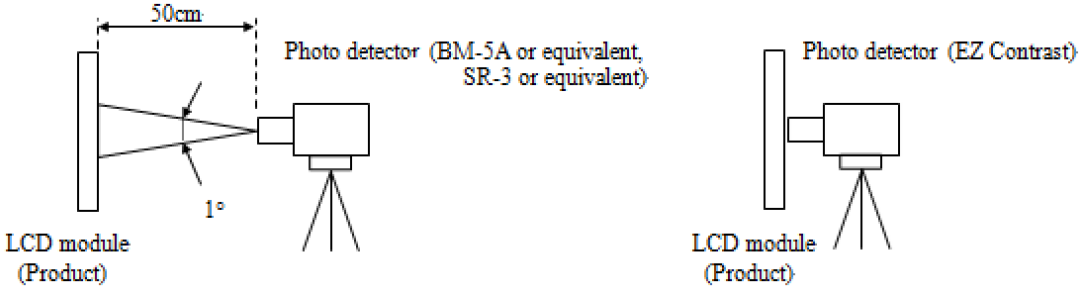
Note1: These are initial characteristics.

Note2: Measurement conditions are as follows.

Ta= 25°C, VCC= 5.0V, VDD=24.0V, PWM duty ratio: 100%,

Display mode: FHD, Horizontal cycle= 1/67.43kHz, Vertical cycle= 1/59.94Hz

Optical characteristics are measured at luminance saturation 20minutes after the product works, in the dark room. Also measurement methods are as follows



Note3: See "4.11.2 Definition of contrast ratio".

Note4: See "4.11.3 Definition of luminance uniformity".
Note5: These coordinates are found on CIE 1931 chromaticity diagram.
Note6: Product surface temperature: Top=35°C±5°C.
Note7: See "4.11.4 Definition of response times".
Note8: See "4.11.5 Definition of viewing angles".

Definition of contrast ratio:

The contrast ratio is calculated by using the following formula.

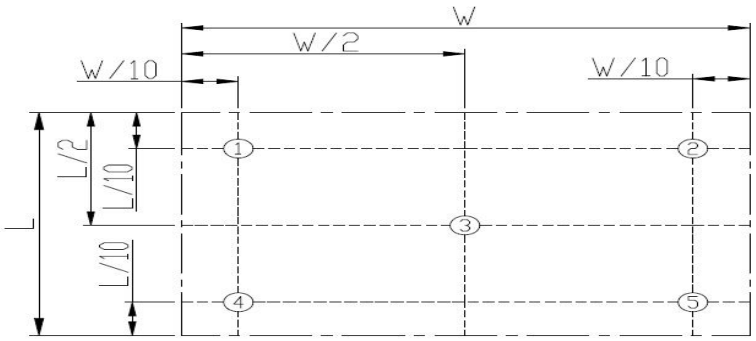
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance of white screen}}{\text{Luminance of black screen}}$$

Definition of luminance uniformity:

The luminance uniformity is calculated by using following formula.

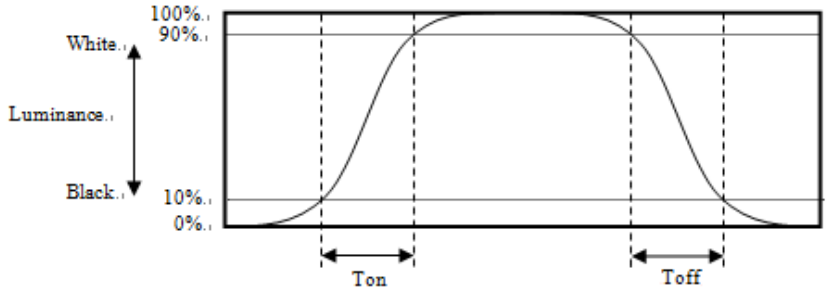
$$\text{Luminance uniformity (LU)} = \frac{\text{Maximum luminance from ① to ⑤}}{\text{Minimum luminance from ① to ⑤}}$$

The luminance is measured at near the 5 points shown below. "W" means AA area width (335.34mm). "L" means AA area length (596.16mm).

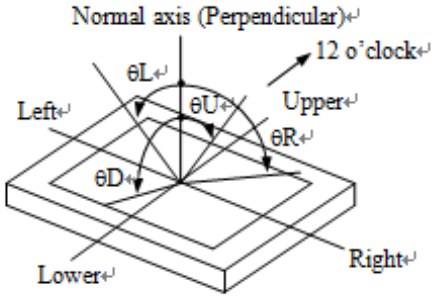


Definition of response times:

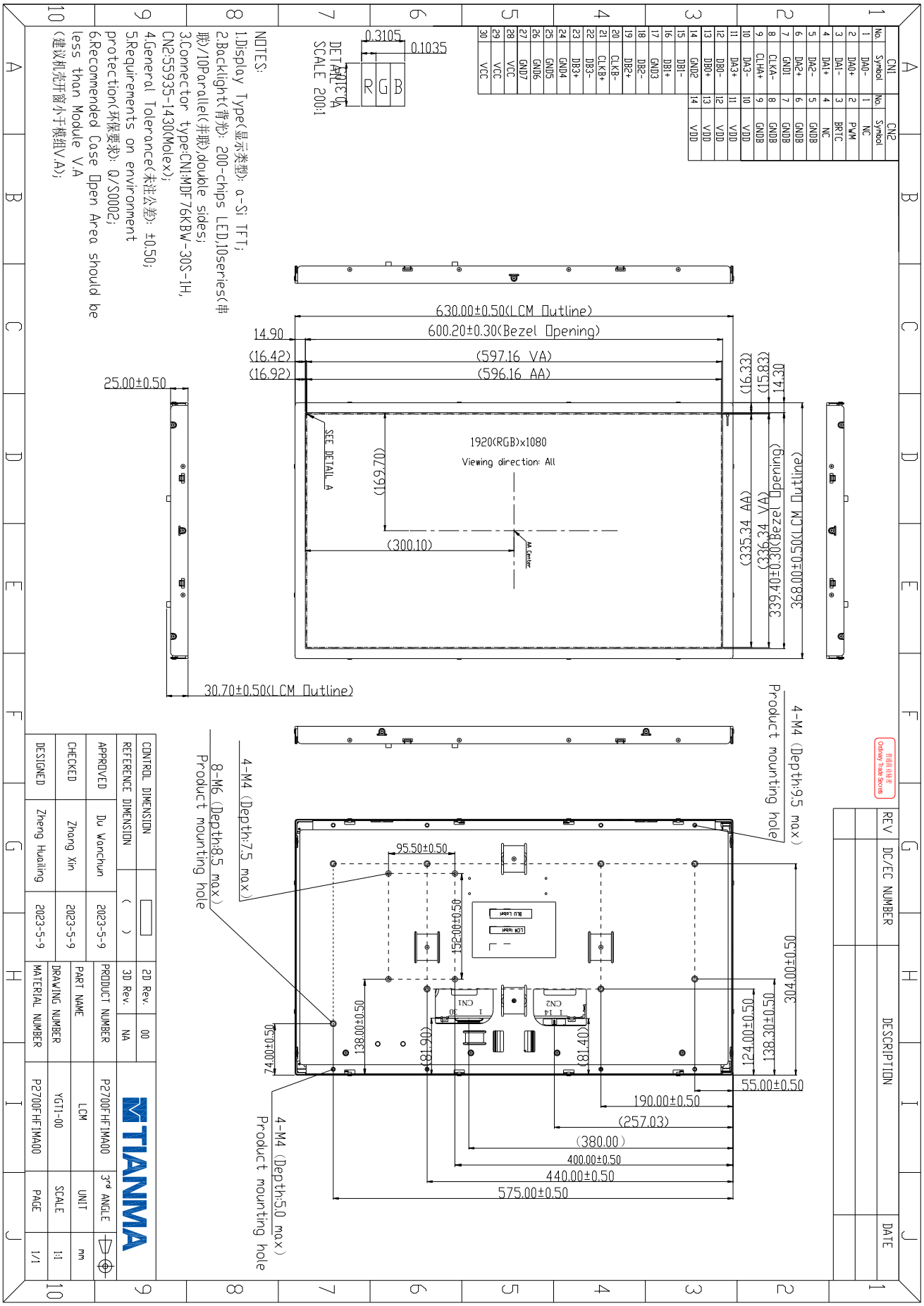
Response time is measured at the time when the luminance changes from "black" to "white ", or "white" to "black " on the same screen point, by photo-detector. Ton is the time when the luminance changes from 10% up to 90%.
Also Toff is the time when the luminance changes from 90% down to 10% (See the following diagram.).



Definition of viewing angle:



8. Mechanical drawing

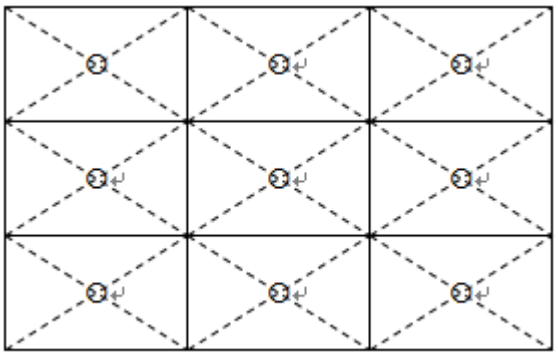


9. Reliability Test

Test item		Condition	Judgment
High temperature and humidity (Operation)		① +50 ± 2°C, RH= 80%, 240hours ② Display data is white.	No display malfunctions
High temperature (Operation)		①+70 ± 3°C, 240hours ② Display data is white.	
Low temperature (Operation)		① Ta=-30 ± 3°C, 240hours Note3 ② Display data is white.	
Thermal shock (Non operation)		① -20 ± 3°C…30minutes +60 ± 3°C…30minutes ② 100cycles, 1hour/cycle ③ Temperature transition time is within 5 minutes.	
ESD (Operation)	Contact Discharge	① 150pF, 330Ω, ±8kV ② 9 places on a panel surface Note4 ③ 10 times each places at 1 sec interval	
	Air Discharge	① 150pF, 330Ω, ±15kV ② 9 places on a panel surface Note4 ③ 10 times each places at 1 sec interval	
Vibration (Non operation)		① 5 to 100Hz, 11.76m/s2 ② 1 minute/cycle ③ X, Y, Z directions ④ 10 times each directions	No display malfunctions No physical damages
Mechanical shock (Non operation)		① 294m/ s2, 11ms ② ±X, ±Y, ±Z directions ③ 3 times each directions	

Table 9.1 Reliability test

Note1: Display and appearance are checked under environmental conditions equivalent to the inspection conditions of defect criteria.
Note2: The maximum temperature front and rear surface of LCD module.
Note3: Ta is the ambient temperature of sample.
Note4: See the following figure for discharge points.

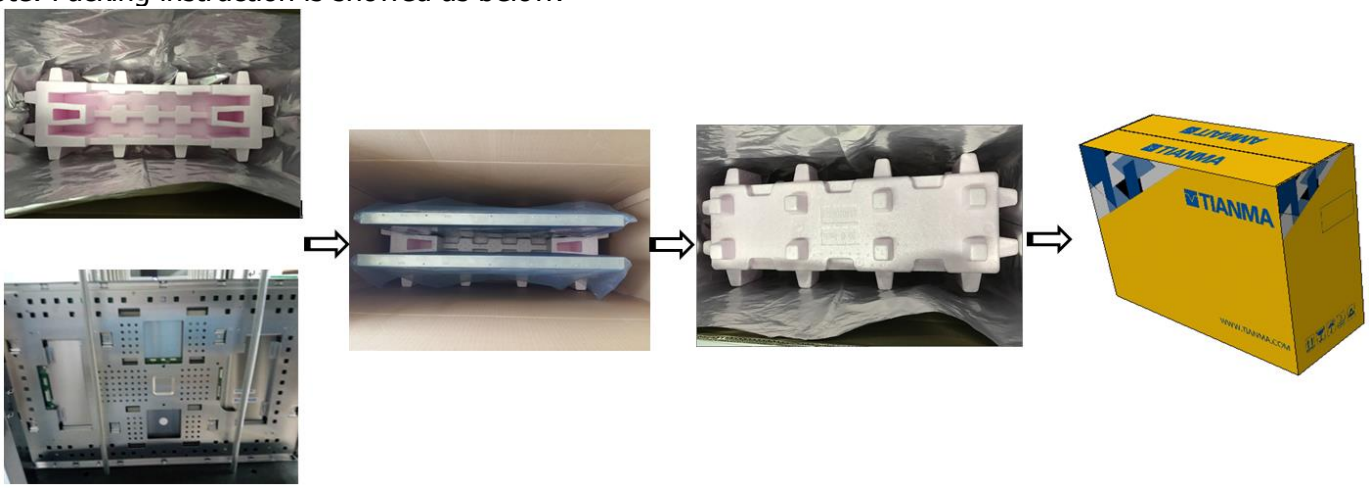


10. Packing Instruction

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM270UDGP01-00	630 x368 x25	4.2	2	
2	Anti-static Bag	LD-PE	720×620x0.1	0.082	2	Anti-static
3	EPP	EPP	817×313.5×210	0.478	2	
4	Vacuum bag	PE	1200x1000x0.12	0.5	1	
5	Inside Carton	Corrugated paper	820×316×542	2.058	1	
6	Total weight	12.078 Kg ± 5 %				

Table 10.1 Packing instruction

Note: Packing instruction is showed as below:



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 ℃ 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 t hem 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 carefully to limit or stop its function when over current is detected on the L ED.