ALL SHORE INDUSTRIES

ASI-T-8801248A4LN/D

Item	Contents	Unit
Size	8.8	inch
Resolution	1280(RGB) X 480	/
Interface	LVDS	/
Technology type	a-Si TFT	/
Pixel pitch	0.1635x0.1635	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D)	229.6x 97.3 x 6.0	mm
Active Area	209.28x 78.48	mm
Display Mode	Transmissive Normally Black	/
Backlight Type	WhiteLED	/
Weight	215	g

Record of Revision

Date	Revision No.	Summary
2015-10-25	1.0	Rev 1.0 was issued

1. Scope

This data sheet is to introduce the specification of ASI-T-8801248A4LN/D active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, TCON, and a backlight unit. The 8.8" Display area contains 1280(RGB) X 480 pixels.

2. Application

Digital equipments which need color display, monitor, POS, video systems.

3. General Information

Item	Contents	Unit
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Backlight Type	WhiteLED	/
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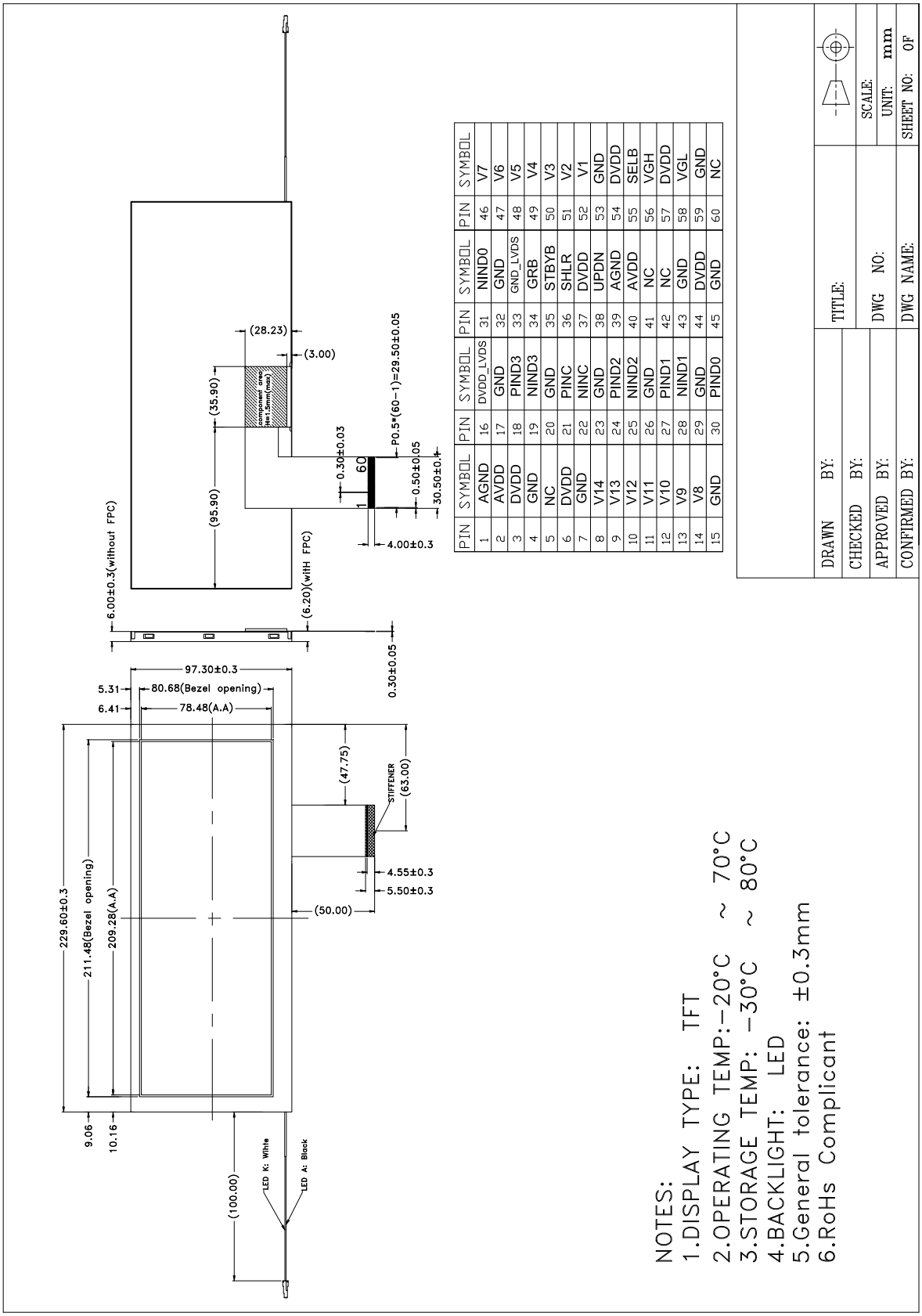
4. Outline Drawing



PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL
1	AGND	16	DVDD_LVDS	31	NIND0	46	V7
2	AVDD	17	GND	32	GND	47	V6
3	DVDD	18	PIND3	33	GND_LVDS	48	V5
4	GND	19	NIND3	34	GRB	49	V4
5	NC	20	GND	35	STBYB	50	V3
6	DVDD	21	PINC	36	SHLR	51	V2
7	GND	22	NINC	37	DVDD	52	V1
8	V14	23	GND	38	UPDN	53	GND
9	V13	24	PIND2	39	AGND	54	DVDD
10	V12	25	NIND2	40	AVDD	55	SELB
11	V11	26	GND	41	NC	56	VGH
12	V10	27	PIND1	42	NC	57	DVDD
13	V9	28	NIND1	43	GND	58	VGL
14	V8	29	GND	44	DVDD	59	GND
15	GND	30	PIND0	45	GND	60	NC

5. Interface signals

5.1 CN1 for LVDS

No	Symbol	Function
1	AGND	Analog ground
2	AVDD	Analog power
3	DVDD	Digital power
4	GND	Digital ground
5	NC	Not connect
6	DVDD	Digital power
7	GND	Digital ground
8	V14	Gamma correction voltage reference
9	V13	Gamma correction voltage reference
10	V12	Gamma correction voltage reference
11	V11	Gamma correction voltage reference
12	V10	Gamma correction voltage reference
13	V9	Gamma correction voltage reference
14	V8	Gamma correction voltage reference
15	GND	Digital ground
16	DVDD_LVDS	LVDS power
17	GND	Digital ground
18	PIND3	Positive LVDS differential data input
19	NIND3	Negative LVDS differential data input
20	GND	Digital ground
21	PINC	Positive LVDS differential clock input
22	NINC	Negative LVDS differential clock input
23	GND	Digital ground
24	PIND2	Positive LVDS differential data input
25	NIND2	Negative LVDS differential data input
26	GND	Digital ground
27	PIND1	Positive LVDS differential data input
28	NIND1	Negative LVDS differential data input
29	GND	Digital ground
30	PIND0	Positive LVDS differential data input
31	NIND0	Negative LVDS differential data input
32	GND	Digital ground
33	GND_LVDS	LVDS ground
34	GRB	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=47K ， C=1 μ F)
35	STBYB	Standby mode, normally pull high STBYB=”1”, normal operation STBYB=”0”,timing control, source driver will turn off, all output are GND, suggest to turn off AVDD power simultaneously
36	SHLR	Left or right display control
37	DVDD	Digital power
38	UPDN	Up / down display control
39	AGND	Analog ground
40	AVDD	Analog power

41	NC	Not connect
42	NC	Not connect
43	GND	Digital ground
44	DVDD	Digital power
45	GND	Digital ground
46	V7	Gamma correction voltage reference
47	V6	Gamma correction voltage reference
48	V5	Gamma correction voltage reference
49	V4	Gamma correction voltage reference
50	V3	Gamma correction voltage reference
51	V2	Gamma correction voltage reference
52	V1	Gamma correction voltage reference
53	GND	Digital ground
54	DVDD	Digital power
55	SELB	6bit/8bit mode select, SELB = “1”, LVDS input data is 8bits SELB = “0”, LVDS input data is 6bits
56	VGH	Positive power for TFT
57	DVDD	Digital power for Gate IC
58	VGL	Negative power for TFT
59	GND	Digital ground for Gate IC
60	NC	Not connect

Note 1:Mating connector：089K60-000100-G2-R (STARCONN)
Note 2: UPDN and SHLR control function

SHLR	UPDN	Data shifting
DVDD	GND	Left →Right，Up→Down(default)
GND	GND	Right→Left，Up→Down
DVDD	DVDD	Left→Right，Down→Up
GND	DVDD	Right→Left，Down→Up

5.2 CN2 for LED Backlight

No	Symbol	Description
1	A(+)	positive pole(black)
2	K(-)	negative pole(white)

Note1: Input connector : BHSR-02VS-1(JST)
Outlet connector: SM02B-BHSS-1(JST)

6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

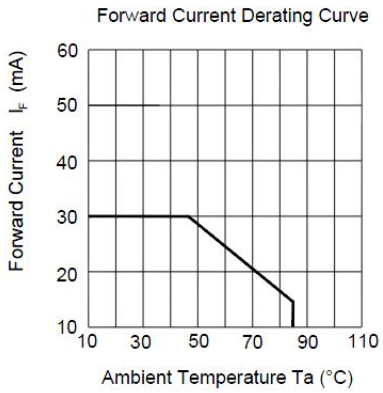
Item	Symbol	MIN	MAX	Unit
Digital Supply Voltage	DVDD DVDD_LVDS	-0.3	5.0	V
Analog Supply Voltage	AVDD	-0.5	15	V
Gate On Voltage	VGH	-0.3	VGL+44	V
Gate Off Voltage	VGL	VGH-44	0.3	V
Gate On-Gate Off Voltage	VGH-VGL	VGL-0.3	VGH+0.3	V
Signal Input Voltage	NIND0 ~ NIND3 PIND0 ~ PIND3 NINC,PINC	-0.3	DVDD+0.3	V
Forward Current （per LED）	If		80	mA
Pulse forward current（per LED）	Ifp		200	mA

6.2. Environment Conditions

Item	Symbol	MIN	MAX	Unit	Remark
Operating Temperature	TOPR	-20	70	℃	
Storage Temperature	TSTG	-30	80	℃	

Note：

1) If the product were used out of the operation and storage range, it will have quality issue.
2) Ifp Conditions ： Pulse Width≦10msec，Duty≦1/10.
3) Each one of LED operation must be follow diagram of Ambient Temperature and Allowable Forward Current.



4) If users use the product out off the environmemtal operation range（temperature and humidity）, it will have visual quality concerns

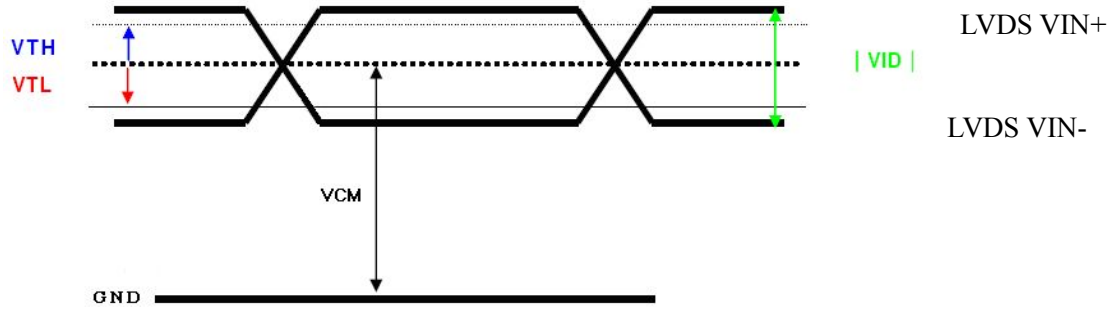
7. Electrical Specifications

7.1 Electrical characteristics for LCD

GND=0V, Ta=25℃

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Digital Power Supply Voltage For LCD	DVDD VDD_LVDS	3	3.3	3.6	V	
Logic Input Voltage (LVDS:IN+,IN-)	VCM	$\frac{\lvert VID \rvert}{2}$	-	DVDD-1.2	V	Note1
	$\lvert VID \rvert$	200	-	600	mV	Note1
	VTH	-	-	100	mV	VCM=1.2V Note1
	VTL	-100	-	-	mV	
Analog Power Supply Voltage	AVDD	12.8	13	13.2	V	
Gate On Power Supply Voltage	VGH	19	20	21	V	
Gate Off Power Supply Voltage	VGL	-6.6	-6	-5.4	V	
Logic Input Voltage	VIH	0.7*DVDD	-	DVDD	V	
	VIL	GND	-	0.3*DVDD	V	
Gamma Voltage	V1	-	12.29	-	V	Note2
	V2	-	10.38	-	V	
	V3	-	9.79	-	V	
	V4	-	9.09	-	V	
	V5	-	8.49	-	V	
	V6	-	8.01	-	V	
	V7	-	6.96	-	V	
	V8	-	6.04	-	V	
	V9	-	4.99	-	V	
	V10	-	4.51	-	V	
	V11	-	3.92	-	V	
	V12	-	3.21	-	V	
	V13	-	2.62	-	V	
	V14	-	0.71	-	V	

Notes1 : LVDS signal



Note 2: (1)Gamma voltage is the reference voltage for customer, it could be adjust by customer.
(2)The voltage of these pins must be:
V1>V2>V3>V4>V5>V6>V7>V8>V9>V10>V11>V12>V13>V14
AVDD-0.1>V1~V7>0.4AVDD ; 0.6AVDD>V8~V14>AGND+0.1

Note 3: VCOM must be optimized according to each LCM.
Please adjust VR to make the flicker level be minimum for getting excellent image.

7.2 Current Consumption

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Gate on Current	IVGH	-	0.5	1	mA	VGH =20V
Gate off Current	IVGL	-	0.5	1	mA	VGL= -6V
Digital Current	IDVDD	-	25	35	mA	DVDD = 3.3V
Analog Current	IAVDD	-	30	60	mA	AVDD = 13V
Total Power Consumption	PC	-	485.5	492.5	mW	

Note1: Typical: Under 256 gray pattern
Maximum: Under white pattern

256 gray pattern

White Pattern

7.3 Drive for Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
LED current	IL	-	280	-	mA	
LED voltage	VL	8.55	9.75	10.8	V	
Power consumption	WL	-	2.73	-	mW	
LED Lifetime	-	3000	30	60	Hrs	

Notes1 : Using the constant current control to avoid the leakage light and brightness quality issue.

Notes 2:Definition of LED life time: Luminance under 50% of the initail value. LED life time is restricted under normal condition, ambient temperature=25℃and LED operation forward current=280mA

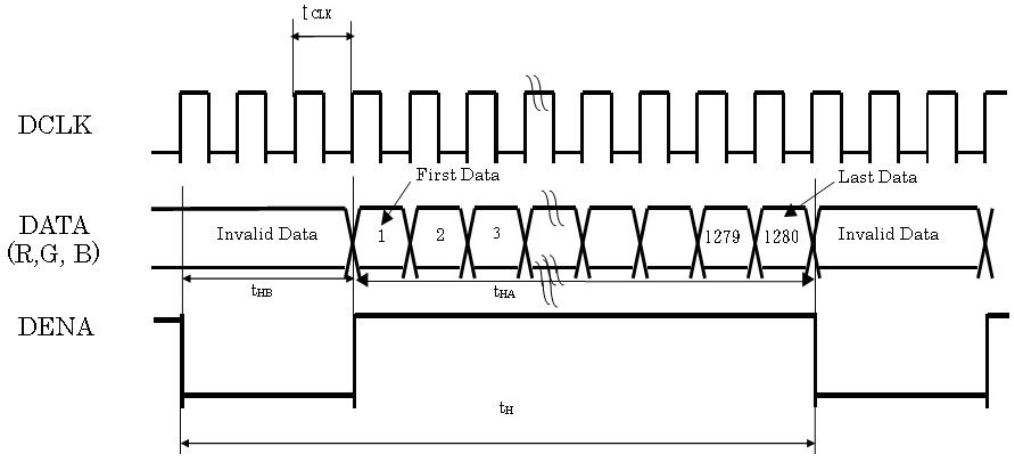
8. Command/AC Timing

8.1 Timing Specifications

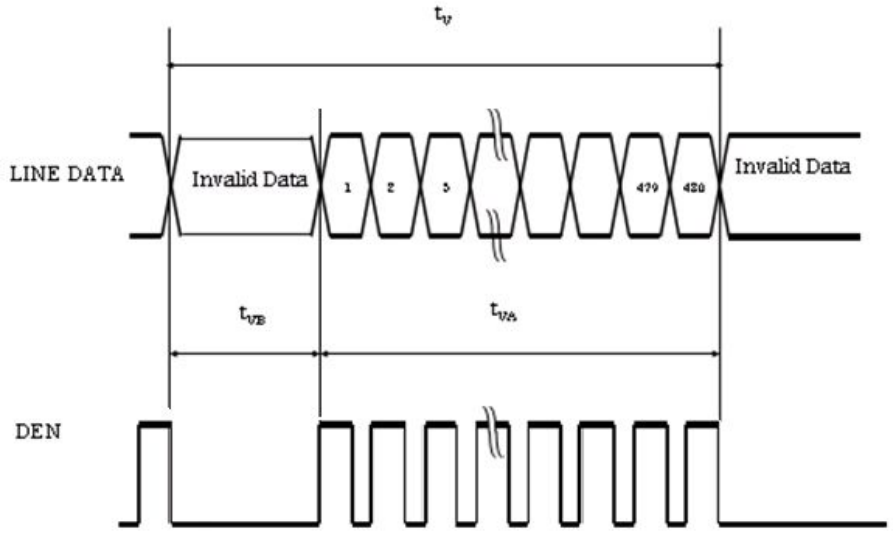
Item				Symbol	Min.	Typ.	Max.	Unit
LVDS input signal sequence	CLK Frequency			tclk	42	45	60	MHz
LCD input signal sequence (Input LVDS Transmitter)	DENA	Horizontal	Horizontal total Time	t_H	1373	1413	1488	tCLK
			Horizontal effective Time	t_{HA}	1280			tCLK
			Horizontal Blank Time	t_{HB}	93	133	208	tCLK
		Vertical	Vertical total Time	t_V	517	533	672	t_H
			Vertical effective Time	t_{VA}	480			t_H
			Vertical Blank Time	t_{VB}	37	53	192	t_H

8.2 Timing Chart

a. Horizontal Timing

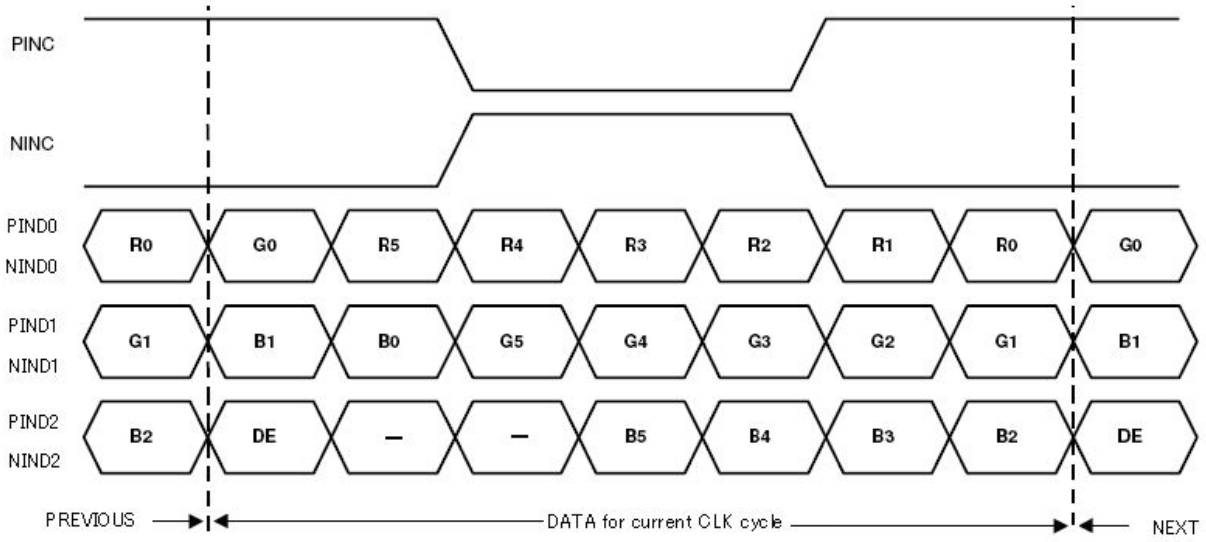


b. Vertical Timing

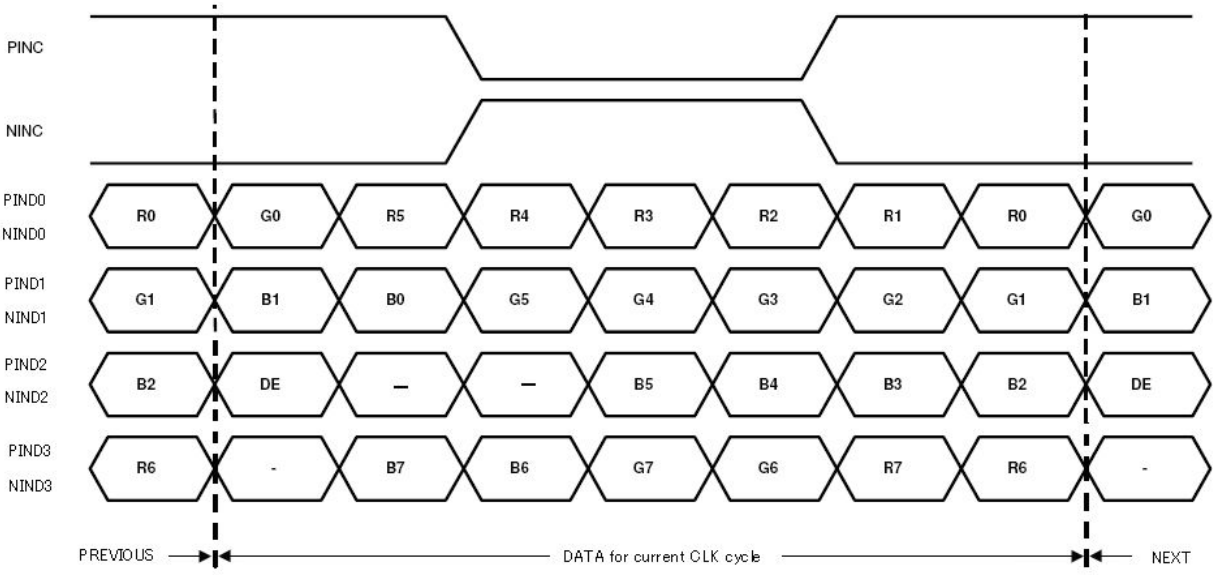


8.3 LVDS Input Data mapping

1) 6 Bit LVDS input



2) 8 Bit LVDS input



8.4 Color Data Assignment

COLOR	INPUT DATA	R DATA								G DATA								B DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB							LSB	MSB							LSB	MSB							LSB
BASIC COLOR	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
	RED(255)	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(255)	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(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	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
	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
	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	RED(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
	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(254)	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(255)	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	GREEN(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
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	GREEN(254)	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(255)	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	BLUE(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
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(254)	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(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

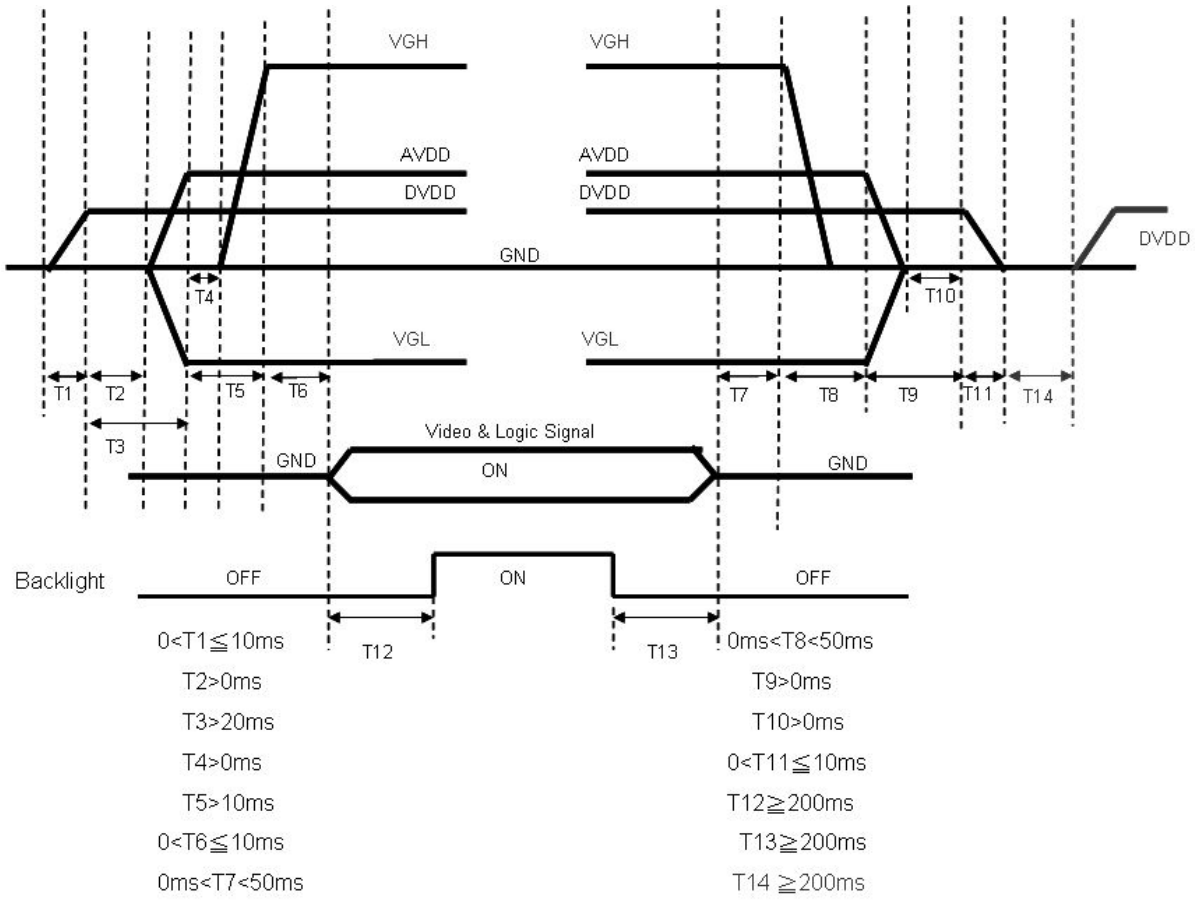
Note:

1) Definition of gray scale:
   Color (n): n indicates gray scale level; higher n means brighter level.
2) Data: 1-High, 0-Low.
3) This assignment is applied to both odd and even data.

8.5 Power and Signal sequence

Power On：DVDD→AVDD/VGL →VGH →Video &Logic Signal→Backlight

Power Off：Backlight→Video &Logic Signal→VGH→AVDD/VGL→DVDD



9. Optical Specification

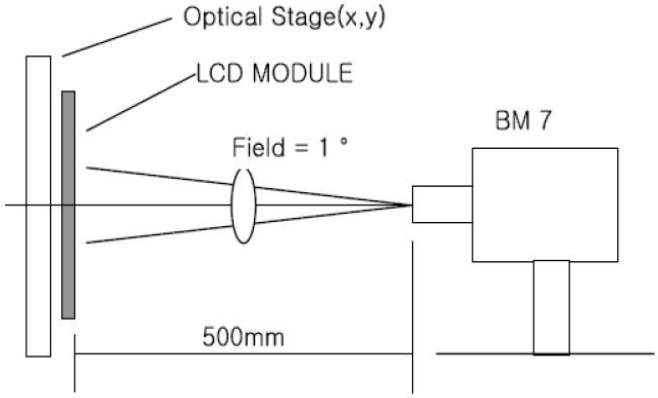
Ta=25℃

Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio		CR	θ=0°	600	1000	--		Note1 Note2
Response Time		Tr+Tf	25℃	--	25	35	ms	Note1 Note3
View Angles		ΘT	CR≧10	75	85	--	Degree	Note 4
		ΘB		75	85	--		
		ΘL		75	85	--		
		ΘR		75	85	--		
Chromaticity	White	x	Brightness is on	Typ-0.05	0.287	Typ+0.05		Note5, Note1
		y			0.289			
	Red	x			0.642			
		y			0.345			
	Green	x			0.321			
		y			0.628			
	Blue	x			0.147			
		y			0.076			
Center Luminance of White		L		400	500	--	cd/m^2	Note1 Note6
Uniformity		U		75	80	--	%	Note1 Note7
NTSC				60	70	--	%	

Note 1: Definition of optical measurement system.

Temperature = 25℃(±3℃);

LED back-light: ON, Environment brightness < 150 lx

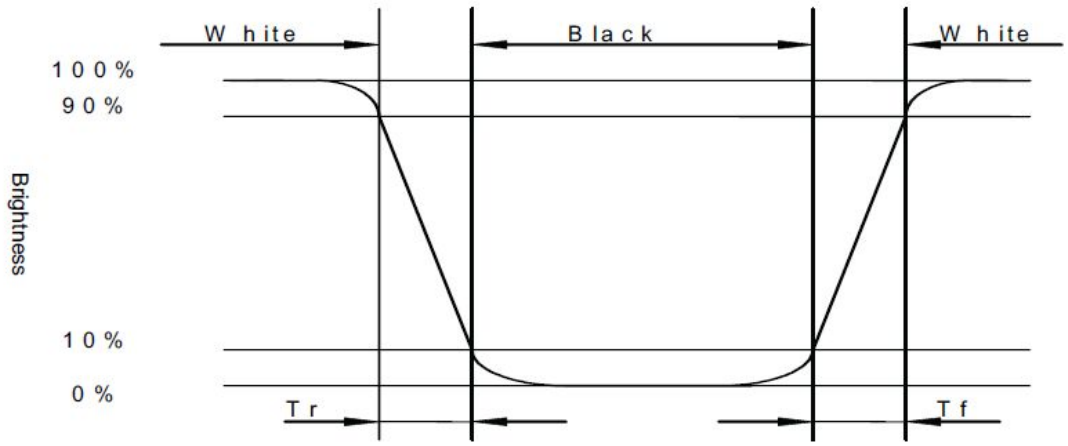


Note 2: Contrast ratio is defined as follow:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

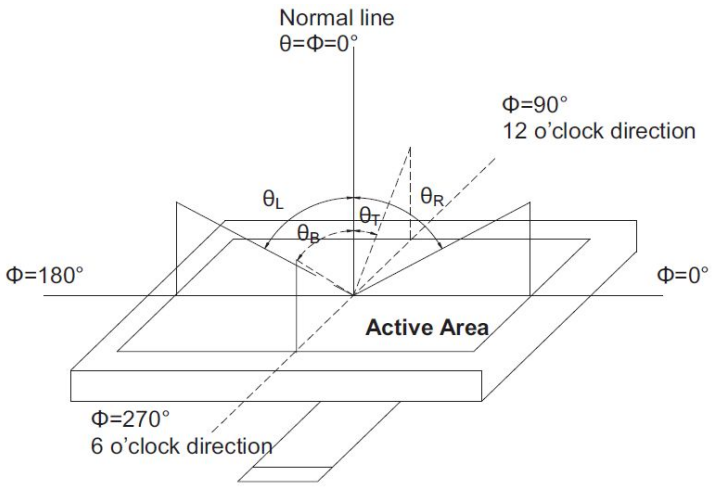
Note 3: Response time is defined as follow:

Response time is the time required for the display to transition from black to white (Rise Time, Tr) and from white to black(Decay Time, Tf).



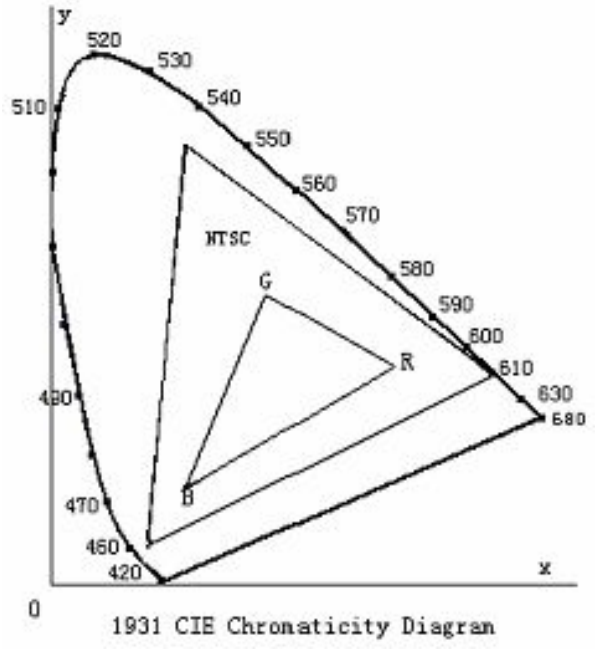
Note 4: Viewing angle range is defined as follow:

Viewing angle is measured at the center point of the LCD.



Note 5: Color chromaticity is defined as follow: (CIE1931)

Color coordinates measured at center point of LCD.



1931 CIE Chromaticity Diagram

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

Note 6: Luminance is defined as follow:

Luminance is defined as the brightness of all pixels "White" at the center of display area on optimum contrast.

Note 7: Luminance Uniformity is defined as follow:

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Uniformity (U)} = \frac{\text{Minimum Luminance(brightness) in 9 points}}{\text{Maximum Luminance(brightness) in 9 points}}$$

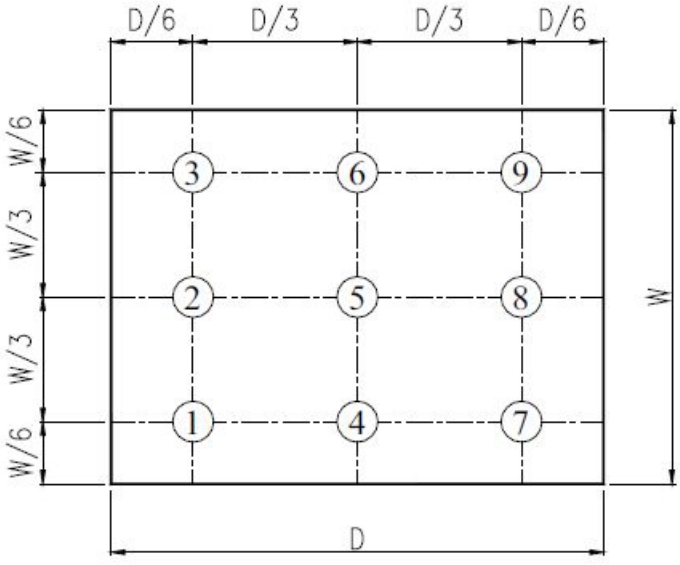


Fig. 2 Definition of uniformity

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ts=+70℃, 240 hrs	Per table in below
2	Low Temp Operation	Ta=-20℃, 240 hrs	Per table in below
3	High Temp Storage	Ta=+80℃, 240 hrs	Per table in below
4	Low Temp Storage	Ta=-30℃, 240 hrs	Per table in below
5	High Temp & High Humidity Storage	Ta=+60℃, 90% RH 240 hrs	Per table in below (polarizer discoloration is excluded)
6	Thermal Shock (Non-operation)	-30 ℃ ↔80 ℃ (0.5 hr), 100 cycle	Per table in below
7	Vibration (Non-operation)	Frequency range:8~33.3Hz Stoke：1.3 mm Vibration:sinusoidal wave, perpendicular axis(both x, z axis: 2hrs ,y axis: 4hrs). Sweep: 2.9G,33.3 Hz -400 Hz Cycle time: 15 min	Per table in below
8	Shock (Non-operation)	Shock level: 980m/s2(equal to 100G). Waveform: half sinusoidal wave,6ms. Number of shocks: +X,+Y,+Z each axis 3 times	Per table in below
9	Image Sticking	25 ℃± 2 ℃ ; 2hrs	Per table in below
10	ESD	150pF，330Ω， 15kV air; 8kV contact	Per table in below
11	Package Drop Test	Height:60 cm, 1 corner, 3 edges, 6 surfaces	Per table in below

INSPECTION	CRITERION(after test)
Appearance	No Crack on the FPC, on the LCD Panel
Alignment of LCD Panel	No Bubbles in the LCD Panel No other Defects of Alignment in Active area
Electrical current	Within device specifications
Function / Display	No Broken Circuit, No Short Circuit or No Black line No Other Defects of Display

11. Precautions for Use of LCD Modules

11.1 Safety

The liquid crystal in the LCD is poisonous. Do not put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.

11.2 Handling

A. The LCD and touch panel is made of plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
B. Do not handle the product by holding the flexible pattern portion in order to assure the reliability
C. Transparency is an important factor for the touch panel. Please wear clear finger sacks, gloves and mask to protect the touch panel from finger print or stain and also hold the portion outside the view area when handling the touch panel.
D. Provide a space so that the panel does not come into contact with other components.
E. To protect the product from external force, put a covering lens (acrylic board or similar board) and keep an appropriate gap between them.
F. Transparent electrodes may be disconnected if the panel is used under environmental conditions where dew condensation occurs.
G. Property of semiconductor devices may be affected when they are exposed to light, possibly resulting in IC malfunctions.
H. To prevent such IC malfunctions, your design and mounting layout shall be done in the way that the IC is not exposed to light in actual use.

11.3 Static Electricity

A. Ground soldering iron tips, tools and testers when they are in operation.
B. Ground your body when handling the products.
C. Power on the LCD module before applying the voltage to the input terminals.
D. Do not apply voltage which exceeds the absolute maximum rating.
E. Store the products in an anti-electrostatic bag or container.

11.4Storage

A. Store the products in a dark place at +25℃±10℃ with low humidity (40% RH to 60% RH).
Don't expose to sunlight or fluorescent light.
B. Storage in a clean environment, free from dust, active gas, and solvent.

11.5 Cleaning

A. Do not wipe the touch panel with dry cloth, as it may cause scratch.
B. Wipe off the stain on the product by using soft cloth moistened with ethanol. Do not allow ethanol to get in between the upper film and the bottom glass. It may cause peeling issue or defective operation. Do not use any organic solvent or detergent other than ethanol.

11.6 Cautions for installing and assembling

Bezel edge must be positioned in the area between the Active area and View area. The bezel may press the touch screen and cause activation if the edge touches the active area.
A gap of approximately 0.5mm is needed between the bezel and the top electrode. It may cause unexpected activation if the gap is too narrow. There is a tolerance of 0.2 to 0.3mm for the outside dimensions of the touch panel and tail. A gap must be made to absorb the tolerance in the case and connector.