ALL SHORE INDUSTRIES

ASI-T-1210HA4LN/D

Item	Contents	Unit
Size	12.1	inch
Resolution	800(RGB)x600	/
Interface	LVDS	/
Technology type	a-Si TFT	/
Pixel pitch	0.3075x0.3075	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D)	279.00x209.00x9.0	mm
Active Area	246.00x184.50	mm
Display Mode	Transmissive, Normally white	/
Backlight Type	LED	/

Record of Revision

Date	Revision No.	Summary
2014-07-10	1.0	Rev 1.0 was issued

1. Scope

This data sheet is to introduce the specification of ASI-T-1210HA4LN/D active matrix TFT module. It is composed of a color TFT-LCD panel, driver ICs, FPC and a backlight unit. The12.1″ display area contains 800(RGB) x600 pixels.

2. Application

Digital equipments which need color display, such as P.O.S, medical equipments and industrial equipments.

3. General Information

Item	Contents	Unit
Size	12.1	inch
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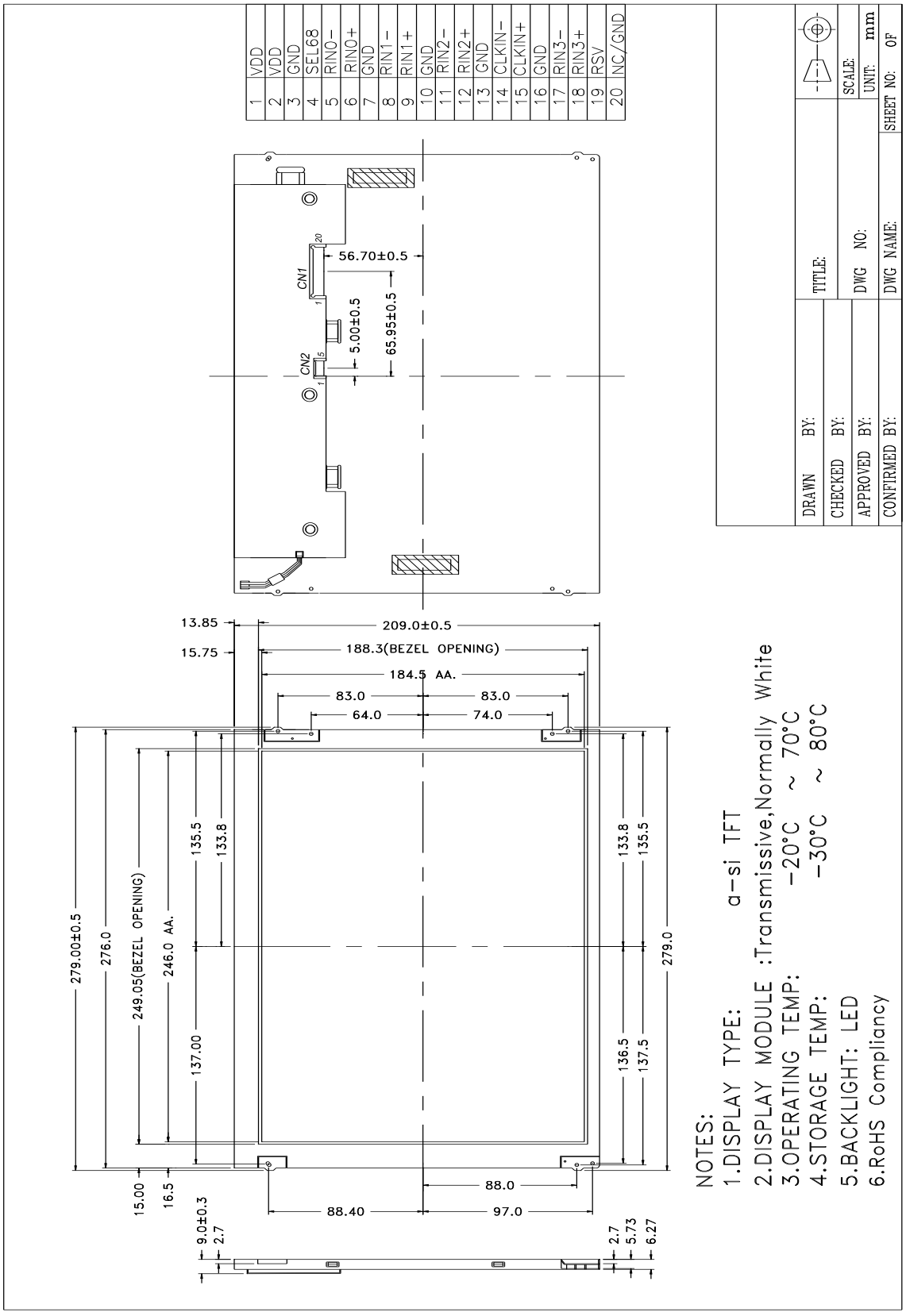
Backlight Type	LED	/

4. Outline Drawing



5. Interface signals

Pin	Name	Description
1	VDD	3.3V Power Supply
2	VDD	3.3V Power Supply
3	GND	Ground
4	SEL68	Select 6 or 8 Bits LVDS Input H:8Bits ; L/NC: 6Bits
5	RIN0-	LVDS receiver signal channel 0, LVDS differential data input(R0,R1,R2,R3,R4,R5,G0)
6	RIN0+	
7	GND	Ground
8	RIN1-	LVDS receiver signal channel 1, LVDS differential data input(G1,G2,G3,G4,G5,B0,B1)
9	RIN1+	
10	GND	Ground
11	RIN2-	LVDS receiver signal channel 2, LVDS differential data input(B2,B3,B4,B5,HS,VS,DE)
12	RIN2+	
13	GND	Ground
14	CLKIN-	LVDS receiver Signal Clock
15	CLKIN+	
16	GND	Ground
17	RIN3-	LVDS receiver signal channel 3, NC for 6Bits LVDS input LVDS differential data input(R6,R7,G6,G7,B6,B7,RSV)
18	RIN3+	
19	RSV	Reverse Scan Function H: Display Reverse; L/NC: Normal Display
20	NC/GND	Test Function Pin Please treat it as NC

Connector: MSB240420-E

LED backlight:

Pin	Name	Description
1	VCC	12V
2	GND	GND
3	On/Off	5V-On / 0V-Off
4	Dimming	PWM Dimming or Analog Dimming
5	NC	NC

Connector: 3808K-F03N-02R

6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

The absolute maximum ratings are list on table as follows. When used out of the absolute maximum ratings, the LSI may be permanently damaged. Using the LSI within the following electrical characteristics limit is strongly recommended for normal operation. If these electrical characteristic conditions are exceeded during normal operation, the LSI will malfunction and cause poor reliability.

Source IC--- HX8245-C

Parameter	Symbol	MAX	Unit
Power Supply Voltage	AVDD	14.85	V
Driver supply voltage	VDD	3.96	V
Input voltage	Vr1~Vr18	AVDD+0.3	V
	Others	0.6VDD	V

Gate IC--- HX8677-G

Parameter	Symbol	MAX	Unit
Power Supply Voltage1	VDD	7.0	V
Power supply voltage2	VGH	42	V
Power supply voltage3	VGH-42	VGH-42	V
Power supply voltage4	VGH-VGL	42	V

Tcon IC---HX8841

Parameter	Symbol	MAX	Unit
Supply Voltage	VDD	3.6	V
CMOS/TTL input voltage	Vin	3.6	V
CMOS/TTL output voltage	Vout	3.6	V
LVDS receiver input voltage	Vin	3.6	V

6.2. Environment Conditions

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

7. Electrical Specifications

7.1 Electrical characteristics

Source IC--- HX8245-C

(For the analog circuit)

Parameter	Symbol	Spec. Min.	Spec. Typ.	Spec. Max.	Unit	Conditions
Supply Voltage	AVDD	6.5	8.4	13.5	V	For the analog circuit power
Input Level of $V_{\gamma1}$ ~ $V_{\gamma7}$	V_{REF}	0.4AVDD	-	AVDD-0.1	V	Gamma correction voltage
Input Level of $V_{\gamma8}$ ~ $V_{\gamma14}$	V_{REF}	0.1	-	0.6AVDD	V	Gamma correction voltage
Output Voltage Deviation	V_{OD}	-	-	±20	mV	-
Voltage Output Offset between Chips	V_{OC}	-	-	±15	mV	-
Dynamic Range of Output	V_{DR}	0.1	-	AVDD-0.1	V	OUT1~OUT1200/1026
Sinking Current of Outputs	I_{OL}	-	|-80|	-	μA	OUT1~OUT1200/1026; AVDD=10V Vo=0.1V v.s 1.0V
Driving Current of Outputs	I_{OH}	-	|80|	-	μA	OUT1~OUT1200/1026; AVDD=10V Vo=9.9V v.s 9.0V
Impedance of Gamma Correction	R_I	0.8Rn	1.1Rn	1.4Rn	Ω	Rn: Internal gamma resistor
Analog Stand-by Current	I_{SC}	-	3.7	-	mA	No load, AVDD=8.4V and all operating is stopped
Analog Operating Current	I_{OC}	-	19	-	mA	F_{CLK}=40MHz F_{LD}=50KHz AVDD=8.4V $V_{\gamma1}$=8V $V_{\gamma14}$=0.4V in black pattern

Gate IC--- HX8677-G

Parameter	Symbol	Applicable pin	Condition	Spec. Min.	Spec. Typ.	Spec. Max.	Unit
Input H voltage	V_{IH}	All input pins	-	0.7VDD	-	VDD	V
Input L voltage	V_{IL}	All input pins	-	VSS	-	0.3VDD	
Output H voltage	V_{OH}	STV1,2	I_{OH}=40μA	VDD-0.4	-	VDD	
Output L voltage	V_{OL}	STV1,2	I_{OL}=40μA	VSS	-	VSS+0.4	
Output H resistance	R_{OH}	OUT1 ~ OUT600	V_{OUT}= VGH-0.5V	-	-	1000	Ω
Output L resistance	R_{OL}	OUT1 ~ OUT600	V_{OUT}= VGL+0.5V	-	-	1000	Ω
Input leakage current	I_{IN}	Note(1)	-	-1.0	-	+1.0	μA
Pull high resistance1	R_{PU}	/XAO	V_{IN}=VSS	40	-	200	kΩ
Pull high resistance2	R_{PU}	Note(2)	VDD=3.3V, T_A=25℃	70	200	400	kΩ
Pull low resistance	R_{PD}	Note(3)	VDD=3.3V, T_A=25℃	70	200	400	kΩ
Power off reset threshold voltage	V_{POFF}	-	-	-	1.6	-	V
VGH Power consumption	I_{VGH}	VGH	Note(4)	-	-	200	μA
VDD Power consumption	I_{VDD}	VDD		-	-	100	

Note: (1) All input except /XAO, MODE1, MODE2, SEG1, SEG2, EVEN.
(2) MODE1, MODE2.
(3) SEG1, SEG2, EVEN.
(4) Power consumption in the following condition:
Output no load, VGH=20V, VGL=-8V, VDD=3.0V, V_{IH}=VDD, V_{IL}=VSS, F_{CPV}=50KHz,
SEG1=SEG2=EVEN=OE1=OE2=OE3=V_{IL}; MODE1=MODE2=/XAO=V_{IH}.

Tcon IC---HX8841

For VDD33 = 3.3 V operation

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_{DD}	Supply Current	F=54MHz, VDD33=3.3V, PI=13KΩ,RL=100Ω pixel checker pattern	-	75	-	mA
CMOS/TTL DC SPECIFICATIONS						
V_{IH}	High Level Input Voltage	-	0.7VDD 33	-	VDD33	V
V_{IL}	Low Level Input Voltage	-	VSS	-	0.3VD D33	V
V_{OH}	High Level Output Voltage	-	0.8 VDD33	-	VDD33	V
V_{OL}	Low Level Output Voltage	-	VSS	-	0.2 VDD33	V
I_{IN}	Input Current	-	-10	-	10	μA
LVDS DC SPECIFICATIONS						
V_{TH}	Differential Input High Threshold	Vlvcm=1.2V	-	-	+100	mV
V_{TL}	Differential Input Low Threshold		-100	-	-	mV
V_{IC}	LVDS Common mode voltage	-	0.7	-	1.6	V
V_{ID}	LVDS swing voltage	-	±100	-	±600	mV
I_{IN}	Input Current	V_{IN}=+2.4V/0V	-	-	10	μA
RSDS DC SPECIFICATIONS						
Vod	Output differential voltage	RL=100Ω PI=13KΩ (Temp=25℃)	-	TBD	-	mV
Vos	Output offset voltage		1.0	1.2	1.4	V
Ios	Output current	output shorted to GND	-	-3.5	-5.0	mA

7.2 LED Backlight Ta=25℃

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	-	80	-	mA	
Forward Voltage	VF	-	27	28.2	V	
LED Life Time			50000	--	hrs	IF=80mA Note 1

Notes:

1. The LED Life-time define as the estimated time to 50% degradation of initial luminous.

7.3 Power Consumption

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Normal mode	I_{VDDI}+ I_{VCI}	-	6.7	-	W	Note

Note:

Frame rate=60HZ, Typ. Pattern White pattern, worst case pattern 1x1 checker 25℃.

8. Command/AC Timing

8.1 TIMING CHARACTERISTICS

Ideal strobe position for LVDS input

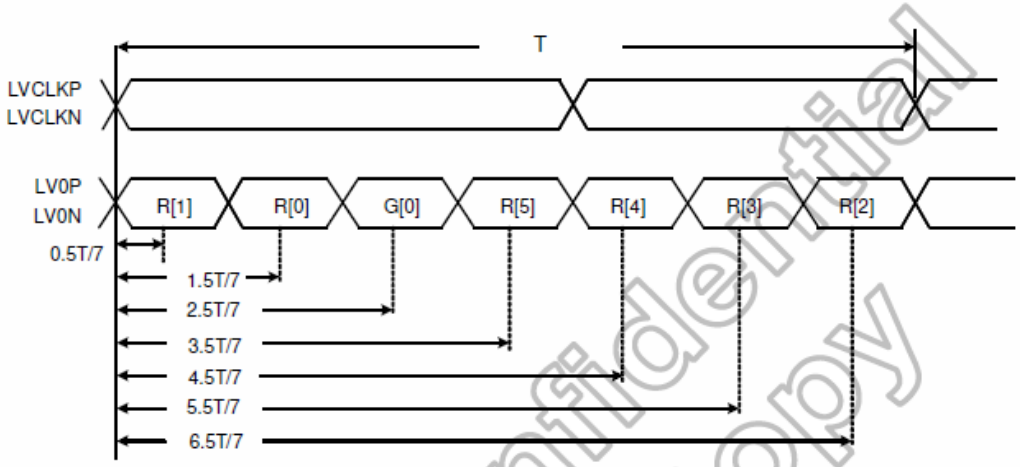


Figure 6.1: LVDS input data ideal strobe position

LVDS input data mapping

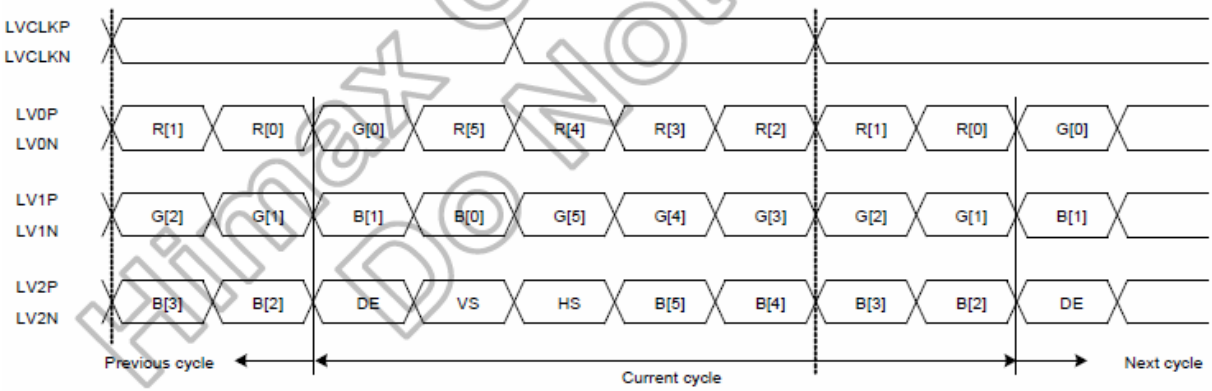


Figure 6.2: LVDS input data mapping

Power up sequence

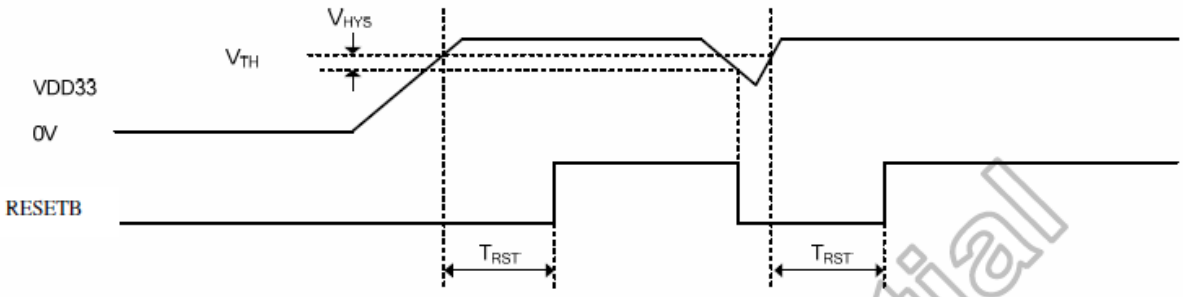


Figure 0.3: Power up sequence

Symbol	Parameter	Condition	Spec.			Unit
			Min.	Typ.	Max.	
V_{TH}	Reset threshold voltage	-	2	2.1	2.2	V
V_{HYS}	Hysteresis voltage	-	-	200	-	mV
T_{RST}	Reset duration @R=10KΩ, C=1μF	-	10	-	-	ms

9. Optical Specification

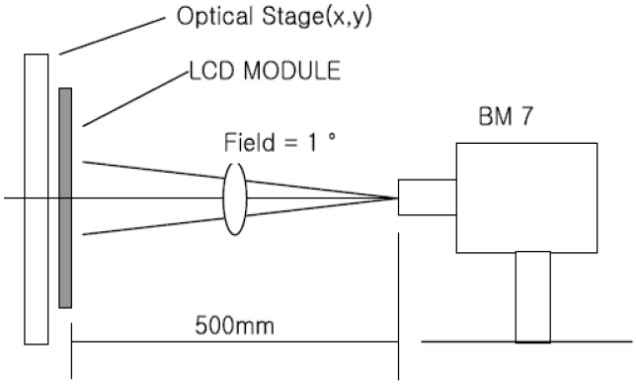
Ta=25℃

Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio		CR	θ=0°	600	800	-		Note1 Note2
Response Time		Ton/ Toff	25℃	-	30	-	ms	Note1 Note3
View Angles		ΘT	CR≧10	55	65	-	Degree	Note 4
		ΘB		65	75	-		
		ΘL		70	80	-		
		θR		70	80	-		
Chromaticity	w	x	Brightness is on	-	0.313	-		Note5, Note1
		y		-	0.329	-		
	R	X		-	TBD	-		
		Y		-	TBD	-		
	G	X		-	TBD	-		
		Y		-	TBD	-		
	B	X		-	TBD	-		
		Y		-	TBD	-		
NTSC		S		-	55	-	%	Note 5
Luminance		L		300	400	-	cd/m^2	Note1 Note6
Uniformity		U		75	80	-	%	Note1 Note7
NTSC					55		%	

Note 1: Definition of optical measurement system.

Temperature = 25℃(±3℃)

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

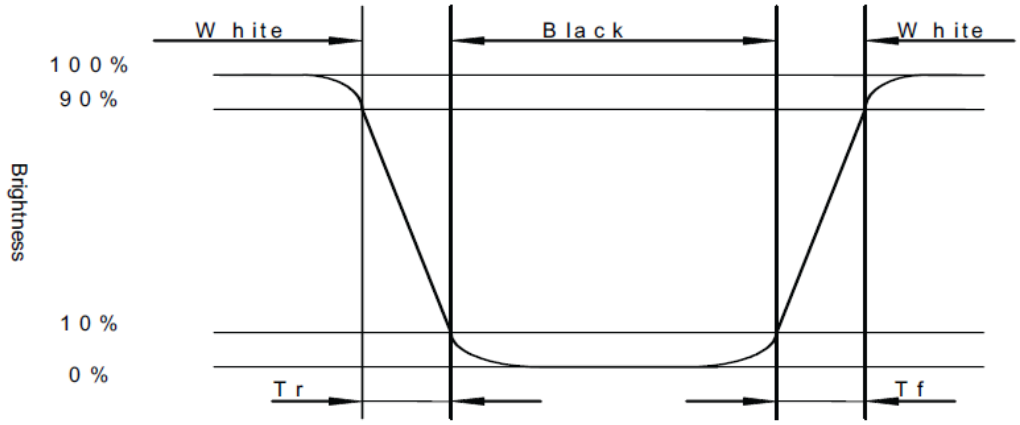


Note 2: Contrast ratio is defined as follow:

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

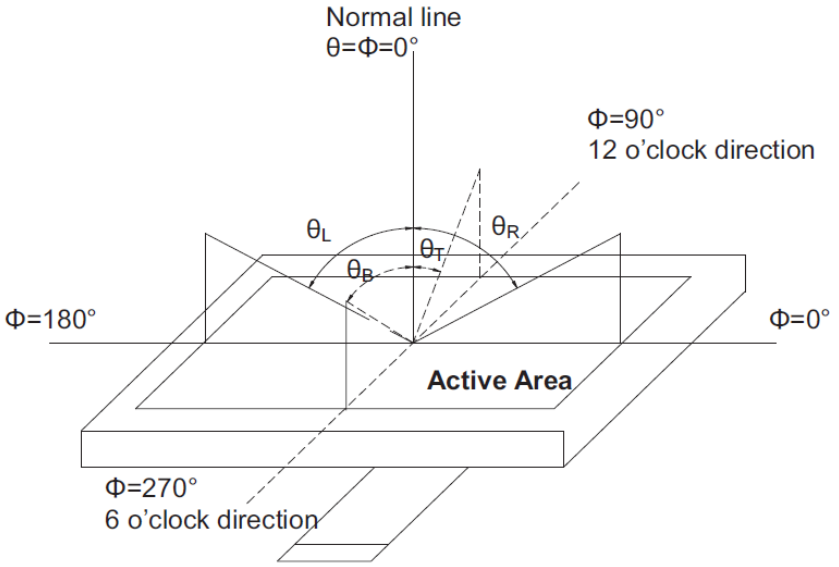
Note 3: Response time is defined as follow:

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).



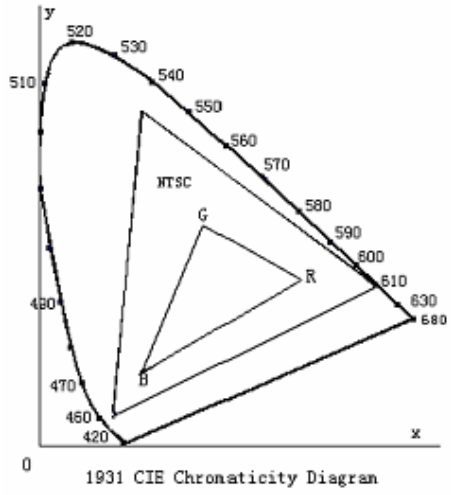
Note 4: Viewing angle range is defined as follow:

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.



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

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.

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

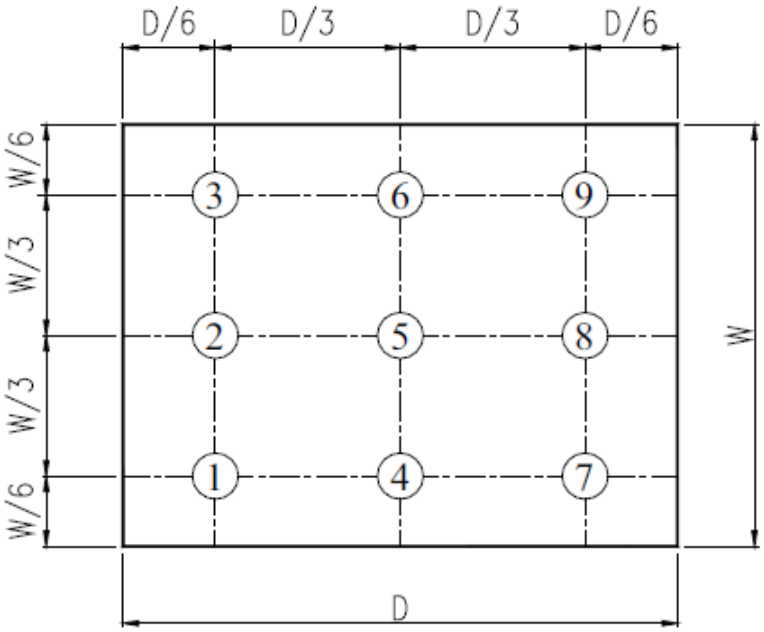


Fig. 2 Definition of uniformity

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ts=+80℃, 96hrs	Per table in below
2	Low Temp Operation	Ta=-30℃, 96hrs	Per table in below
3	High Temp Storage	Ta=+70℃, 48hrs	Per table in below
4	Low Temp Storage	Ta=-20℃, 48hrs	Per table in below
5	High Temp & High Humidity Storage	Ta=+40℃, 90% RH 48 hours	Per table in below (polarizer discoloration is excluded)
6	Thermal Shock (Non-operation)	-30℃ 30 min~+80℃ 30 min, Change time:5min, 10 Cycles	Per table in below
7	ESD (Operation)	C=150pF, R=330Ω，5points/panel Air:±8KV, 5times; Contact:±4KV, 5 times;	Per table in below
8	Vibration (Non-operation)	10Hz~150Hz, 100m/s2, 120min	Per table in below
9	Shock (Non-operation)	Half- sine wave, 300m/s2, 18ms	Per table in below
10	Package Drop Test	25kPa 16H Restore 2H	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.