ALL SHORE INDUSTRIES

ASI-T-130R2A4SPN/D

Item	Contents	Unit
Size	1.3	inch
Resolution	240(RGB) x 240	/
Interface	SPI	/
Technology type	IPS	/
Pixel pitch	0.135 x 0.135	mm
Pixel Configuration	RGB stripes	
Outline Dimension (W x H x D)	35.60 x 37.74 x 1.56	mm
Active Area	32.40 x 32.40	mm
Display Mode	Transmissive, Normally Black	/
Backlight Type	LED	/
Viewing Direction	ALL	/
Driver IC	GC9A01	/
Weight	8	g

Record of Revision

Date	Revision No.	Summary
2023-02-22	1.0	Rev 1.0 was issued

1. Scope

This data sheet is to introduce the specification of ASI-T-130R2A4SPN/D active matrix TFT module. It is composed of a color TFT-LCD panel, driver IC, FPC and a backlight unit. The 1.3" display area contains 240(RGB) x 240 pixels.
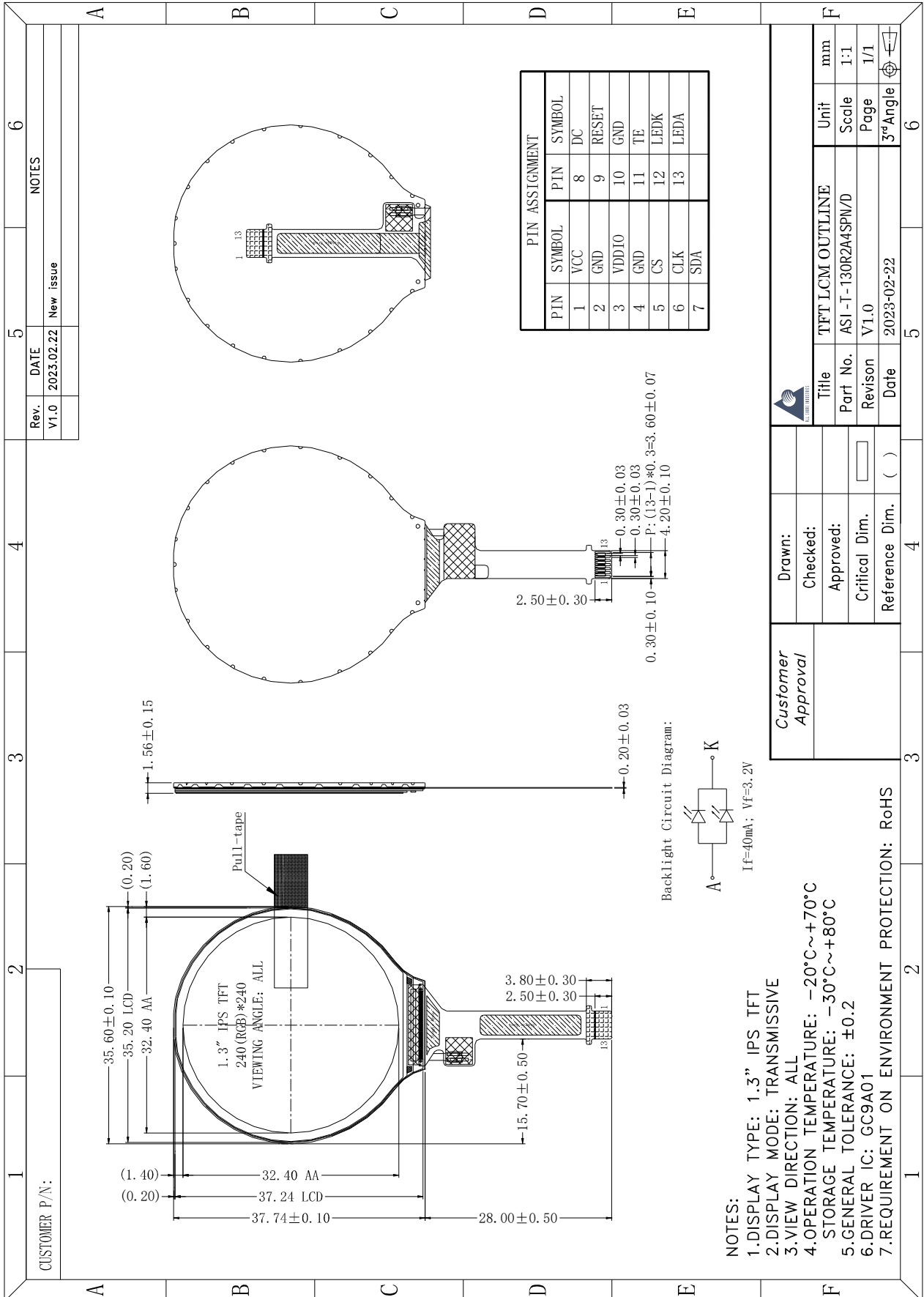
2. Application

Digital equipments which need color display, mobile navigator/video systems.

3. General Information

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4. Outline Drawing

PIN ASSIGNMENT

PIN	SYMBOL	PIN	SYMBOL
1	VCC	8	DC
2	GND	9	RESET
3	VDDIO	10	GND
4	GND	11	TE
5	CS	12	LEDK
6	CLK	13	LEDA
7	SDA		

Backlight Circuit Diagram:

If=40mA; Vf=3.2V

0.30±0.03
0.30±0.03
P: (13-1)*0.3=3.60±0.07
4.20±0.10
2.50±0.30
0.30±0.10

1.56±0.15
0.20±0.03

3.80±0.30
2.50±0.30
15.70±0.50

1.3" IPS TFT
240(RGB)*240
VIEWING ANGLE: ALL

Pull-tape

(0.20)
(1.60)
35.60±0.10
35.20 LCD
32.40 AA

(1.40)
32.40 AA
(0.20)
37.24 LCD
37.74±0.10
28.00±0.50

NOTES:
1. DISPLAY TYPE: 1.3" IPS TFT
2. DISPLAY MODE: TRANSMISSIVE
3. VIEW DIRECTION: ALL
4. OPERATION TEMPERATURE: -20°C~+70°C
   STORAGE TEMPERATURE: -30°C~+80°C
5. GENERAL TOLERANCE: ±0.2
6. DRIVER IC: GC9A01
7. REQUIREMENT ON ENVIRONMENT PROTECTION: RoHS

CUSTOMER P/N:

Rev.	DATE	NOTES
V1.0	2023.02.22	New issue

Customer Approval

Drawn:
Checked:
Approved:
Critical Dim.
Reference Dim.

Title	TFT LCM OUTLINE	Unit	mm	Scale	1:1
Part No.	ASI-T-130R2A4SPN/D			Page	1/1
Revison	V1.0	3rd Angle		6	
Date	2023-02-22				

5. Interface signals

Pin No	Symbol	Function
1	VCC	Analog power supply voltage
2	GND	Ground
3	VDDIO	Digital power supply voltage
4	GND	Ground
5	CS	Chip selective
6	CLK	Serial clock
7	SDA	Serial data
8	DC	Command or date selective
9	RESET	Reset function
10	GND	Ground
11	TE	Tearing effect
12	LEDK	Power for LED Backlight Cathode
13	LEDA	Power for LED Backlight Anode

6. Absolute maximum Ratings

6.1. Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Power supply Voltage	VDD	-0.3	4.6	V	
	VDDIO	-0.3	4.6	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

Ta = 25 °C

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Power Supply Voltage		VDD	2.5	2.8	3.3	V	
		VDDIO	1.65	1.8	3.3	V	
Input voltage	"H"	VIH	0.7*VDDIO	-	VDDIO	V	
	"L"	VIL	0	-	0.3*VDDIO	V	
Output voltage	"H"	VOH	0.8*VDDIO	-	VDDIO	V	
	"L"	VOL	0	-	0.2*VDDIO	V	
Current consumption All black	Logic	$I_{CC}+I_{IN}$	-	8	-	mA	
	Analog						

7.2 LED Backlight

Ta=25℃

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	-	40	-	mA	
Forward Voltage	VF	2.8	3.2	3.4	V	If=40mA
LED Life time	-	-	50,000	-	Hrs	Note

Note: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IF=40mA. The LED life time could be decreased if operating IF is larger than 40mA.

Backlight Circuit Diagram:

A o——K
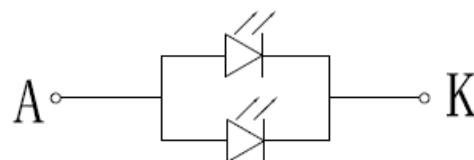
If=40mA; Vf=3.2V

8. Command/AC Timing

8.1 AC Characteristics

8.1.1 Display Serial 4line Interface Timing Characteristics:
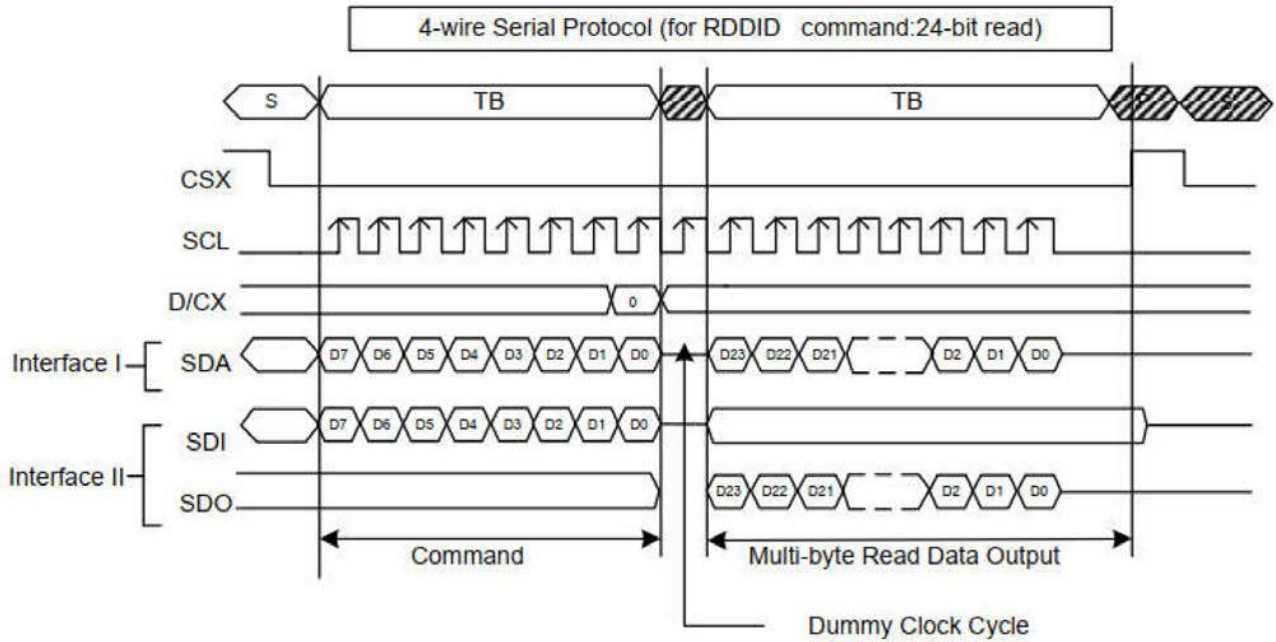
Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	
	taht	Address hold time (Write/Read)	0	-	ns	
CSX	tchw	CSX "H" pulse width	0	-	ns	
	tcs	Chip Select setup time (Write)	15	-	ns	
	trcs	Chip Select setup time (Read ID)	45	-	ns	
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	
	tcsf	Chip Select Wait time (Write/Read)	10	-	ns	
WRX	twc	Write cycle	66	-	ns	
	twrh	Write Control pulse H duration	15	-	ns	
	twrl	Write Control pulse L duration	15	-	ns	
RDX (FM)	trcfm	Read Cycle (FM)	450	-	ns	
	trdhfm	Read Control H duration (FM)	90	-	ns	
	trdlfm	Read Control L duration (FM)	355	-	ns	
RDX (ID)	trc	Read cycle (ID)	160	-	ns	
	trdh	Read Control pulse H duration	90	-	ns	
	trdl	Read Control pulse L duration	45	-	ns	
D[17:0], D[17:10]&D[8:1], D[17:10], D[17:9]	tdst	Write data setup time	10	-	ns	For maximum CL=30pF For minimum CL=8pF
	tdht	Write data hold time	10	-	ns	
	trat	Read access time	-	40	ns	
	tratfm	Read access time	-	340	ns	
	trod	Read output disable time	20	80	ns	

Note: Ta = -30 to 70 °C, VDDI=1.65V to 3.3V, VCI=2.5V to 3.3V, VSS=0V.
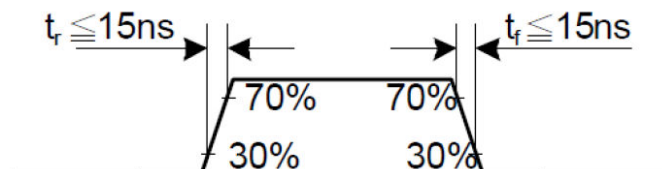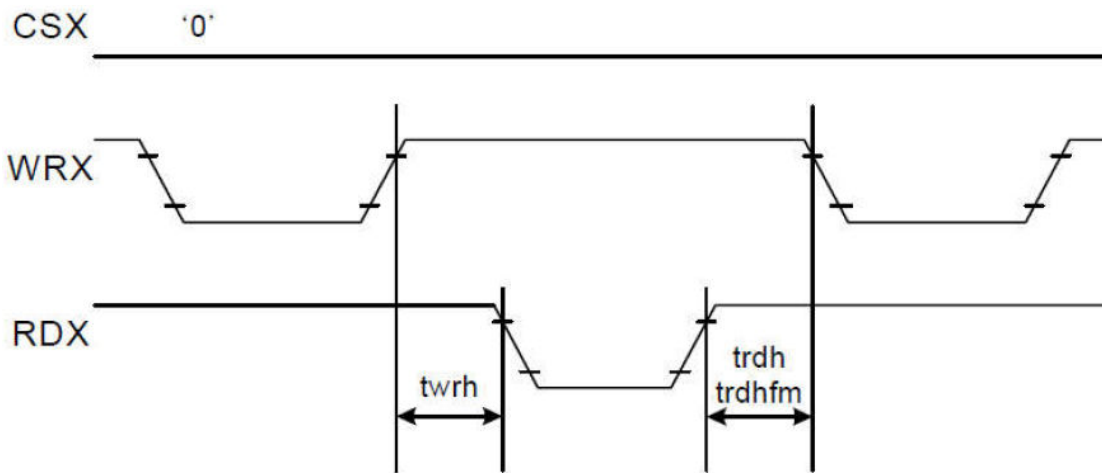
CSX timings :
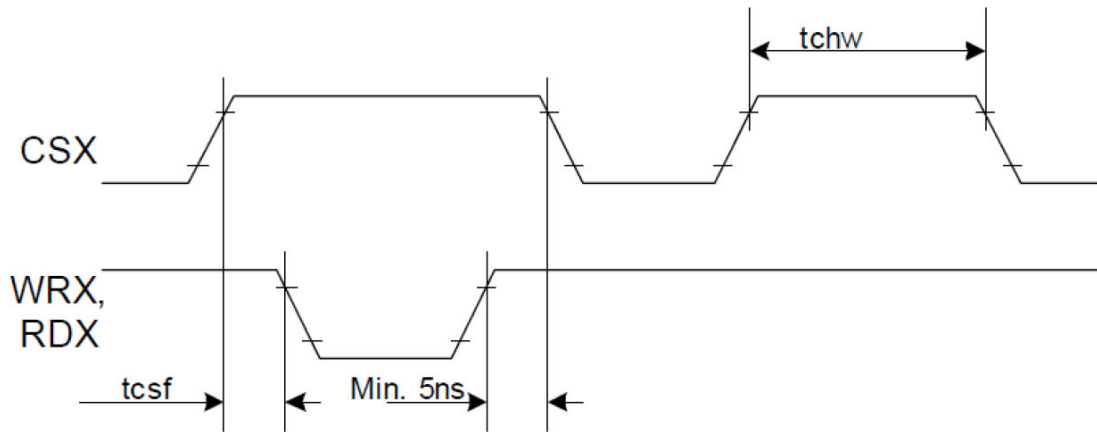
Note: Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

Write to read or read to write timings:

Note: Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

9. Optical Specification

Ta=25℃

Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio		CR	θ=0°	-	1300	-		Note1 Note2
Response Time		Ton/ Toff	25℃	-	30	35	ms	Note1 Note3
View Angles		ΘT	CR≧10	70	80	-	Degree	Note 4
		ΘB		70	80	-		
		ΘL		70	80			
		ΘR		70	80	-		
Chromaticity	White	x	Brightness is on	0.23	0.28	0.33		Note5, Note1
		y		0.29	0.34	0.39		
	Red	x		-	TBD	-		
		y		-	TBD	-		
	Green	x		-	TBD	-		
		y		-	TBD	-		
	Blue	x		-	TBD	-		
		y		-	TBD	-		
Luminance		L		380	450	-	cd/m^2	Note1 Note6
Uniformity		U		80	-	-	%	Note1 Note7

Note 1: Definition of optical measurement system.

Temperature = 25℃(±3℃)

LED back-light: ON, Environment brightness < 150 lx
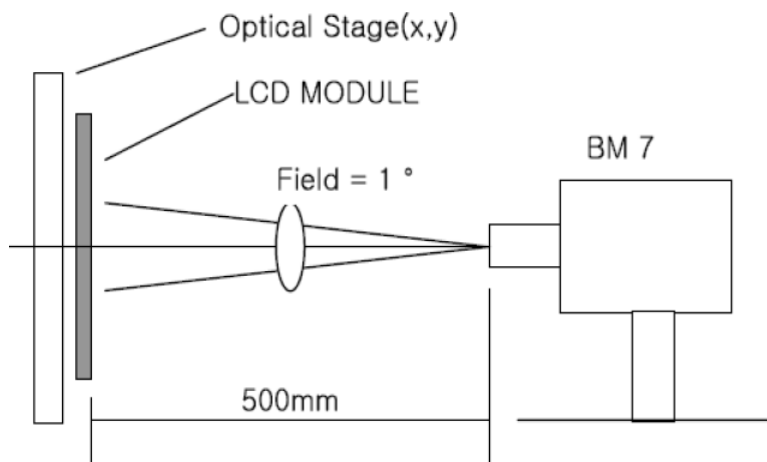
Note 2: Contrast ratio is defined as follow:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$
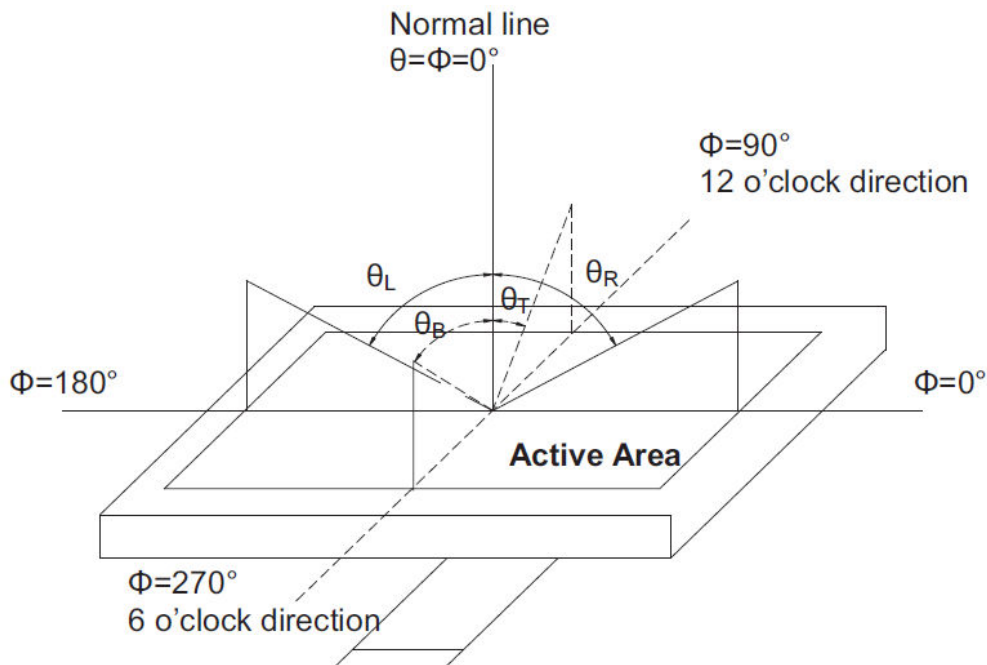
Note 3: Response time is defined as follow:

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).
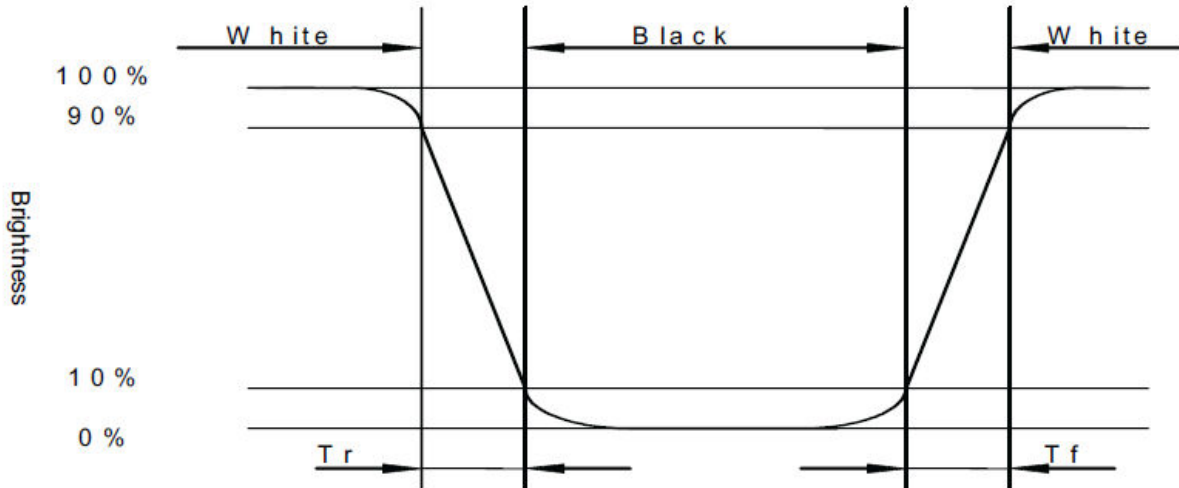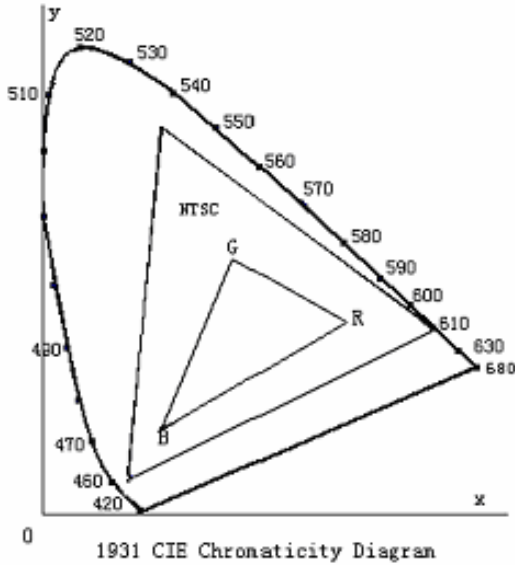

Note 4: Viewing angle range is defined as follow:

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

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

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.

$$Uniformity(U) = \frac{Minimum\ Luminance(brightness)\ in\ 3\ points}{Maximum\ Luminance(brightness)\ in\ 3\ points}$$

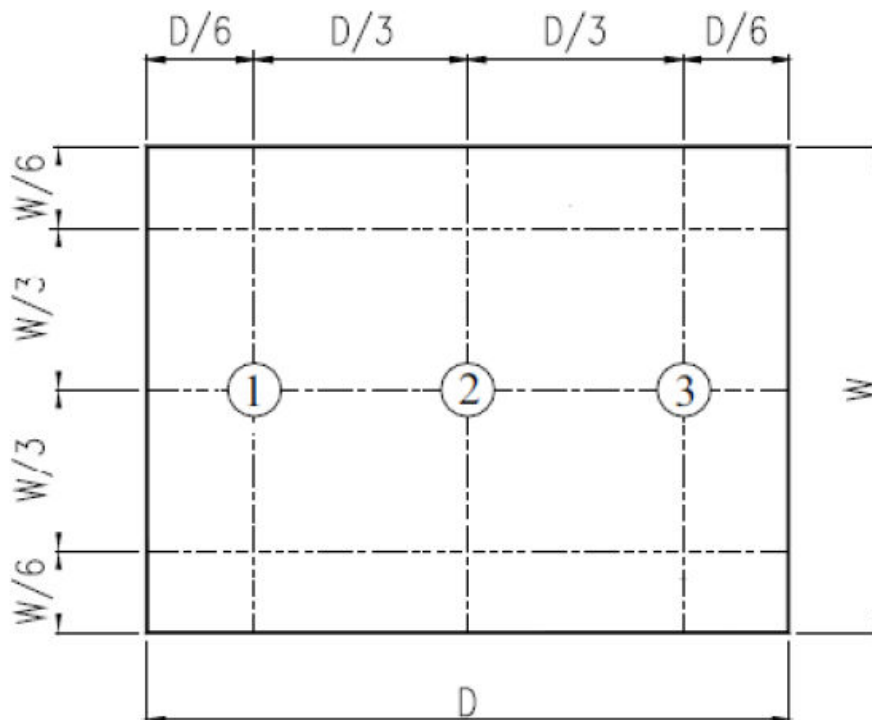Fig. 2 Definition of uniformity

10. Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ta=+70℃, 120hrs	Per table in below
2	Low Temp Operation	Ta=-20℃, 120hrs	Per table in below
3	High Temp Storage	Ta=+80℃, 120hrs	Per table in below
4	Low Temp Storage	Ta=-30℃, 120hrs	Per table in below
5	High Temp & High Humidity Storage	Ta=+50℃, 90% RH, 120hours	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)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z.	Per table in below
9	Shock (Non-operation)	60G 6ms, ±X,±Y,±Z 3times, for each direction	Per table in below
10	Package Drop Test	Height:80 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.
F. Peel off the LCM protective film slowly since static electricity may be generated.

11.4 Storage
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
A. 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.
B. In order to make the display assembly stable and firm, ASI recommends to design some supporting at the display backside, especially for the display with tape-attached touch panel, such supporting is important and essential, or else, the display may drop-off from front after some period of time.
C. Do not display the fixed pattern for a long time because it may develop image sticking due to the LCD structure. If the screen is displayed with fixed pattern, use a screen saver.