



## ASI-T-430FA8A6/W

No	Item	Specification	Remark
1	Type	Transmissive	--
2	Display Mode	Normally White	--
3	Pixel Element	a-Si TFT	--
4	Screen Size	4.3inch	--
5	Resolution	480(RGB) x 272	--
6	Active Area	95.04 (W) x 53.856(L) (mm)	--
7	Pixel Size	0.198 x 0.198 (mm)	--
8	Color Arrangement	RGB-stripe	--
9	Assembly Type	COG	--
10	Back Light	LED	--
11	Good Viewing Direction	12 o'clock	--
12	Gray Scale Inversion Direction	6 o'clock	--
13	Weight	TBD	g
14	Module Dimension	105.5(W) x 67.2(L) x 4.75(H) (mm)	--
15	Touch Panel Mode	Self-capacitance for three point touch	--
16	Touch Panel Interface	I2C	--
17	Touch Panel Resolution	480 x 272	--

**RECORD OF REVISION**

DATE	REV.	PAGE	SUMMARY
2021/12/10	2 ( 1 )	P.3	Modify the Module Dimension: 4.9mm → 4.75mm 1
		P.9	Modify the Outline Dimension, Please refer to 1
2022/01/03	3 ( 2 )	P.1~P.22	Modify the Page number: PAGE : 1/26~26/26 → 1/22~22/22 2
		P.3	4. Add Items : Touch Panel Mode, Please refer to 2 Touch Panel Interface, Please refer to 2 Touch Panel Resolution, Please refer to 2
		P.4	5.1-(c) Modify the Electrical absolute maximum ratings for Touch Panel Controller IC, Please refer to 2
		P.6	6.3 Modify the Electrical characteristics for Touch Panel Controller IC, Please refer to 2
		P.9	8. Modify the Outline Dimension, Please refer to 2
		P.16	12. Modify the Capacitive touch panel programming guide, Please refer to 2
		P.17	14. Modify the Touch Driver IC : GT911→ST1633i, Please refer to 2
2022/01/10	4 ( 3 )	P.3	4. Modify the Touch Panel Mode, Please refer to 3
2023/11/01	5 ( 4 )	P.9	1. Modify the outline dimension, Please refer to 4

### 3. General specifications

#### 3.1 General specifications

It is a color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses the amorphous silicon TFT as a switching devices. This model is composed of a Transmissive type TFT-LCD Panel, a driver circuit and a back-light unit.

#### 3.2 Features

- High image quality a-Si TFT LCD module.
- 16.7M color number.
- Support 24-bit parallel (RGB) input mode
- High contrast, high brightness
- Low power consumption.

### 4. Mechanical data

No	Item	Specification	Remark	
1	Type	Transmissive	--	
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4	Screen Size	4.3inch	--	
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13	Weight	TBD	g	
①	14	Module Dimension	105.5(W) x 67.2(L) x 4.75(H) (mm)	--
③	15	Touch Panel Mode	Self-capacitance for three point touch	--
②	16	Touch Panel Interface	I2C	--
②	17	Touch Panel Resolution	480 x 272	--

## 5. Absolute maximum ratings

### 5.1 Electrical absolute maximum ratings

#### (a) TFT-LCD Panel Absolute Maximum Ratings

Ta=25°C

Item	Symbol	Condition	Standard Value		Unit	Remark
			Min.	Max.		
Power supply voltage	V <sub>DD</sub>	GND=0V	-0.3	4.6	V	--
Logic Input Signal	V <sub>IN</sub>		-0.3	4.6	V	--

- If the LSI is used above these absolute maximum ratings, it may become permanently damaged. Using the LSI within the following electrical characteristics limit is strongly recommended for normal operation. If these electrical characteristic conditions are also exceeded, the LSI will malfunction and cause poor reliability.

#### (b) Back-Light Unit

Ta=25°C

Item	Symbol	Min.	Max.	Unit	Remark
Current	I <sub>LED</sub>	--	50	mA	--

#### ⚠ (c) Touch Panel Controller IC

Ta=25°C

Parameter	Symbol	Ratings (VSS=0V)	unit	Remarks
Supply voltage	V <sub>DD</sub>	-0.3 ~ +6	V	--
Input voltage	V <sub>IN</sub>	-0.3 ~ +6	V	--

### 5.2 Environmental absolute maximum ratings

Item	Symbol	Min.	Max.	Unit	Remark
Operation temperature range	Top	-20	70	°C	Ambient
Storage temperature range	Tst	-30	80	°C	Ambient

- Corrosive gas environment is not acceptable.
- TFT-LCD color will change slightly depending on environment temperature.  
This phenomenon is reversible.

## 6. Electrical characteristics

### 6.1 TFT-LCD Module

Ta = 25°C

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply	V <sub>DD</sub>	3.0	3.3	3.6	V	--
Operating Current	I <sub>DD</sub>	--	TBD	--	mA	--
High level input voltage	V <sub>IH</sub>	0.7V <sub>DD</sub>	--	V <sub>DD</sub>	V	NOTE(1)
Low level input voltage	V <sub>IL</sub>	0	--	0.3V <sub>DD</sub>	V	

NOTE(1): CLK , DE , R0~R7 , G0~G7 , B0~B7

### 6.2 Back-Light Unit

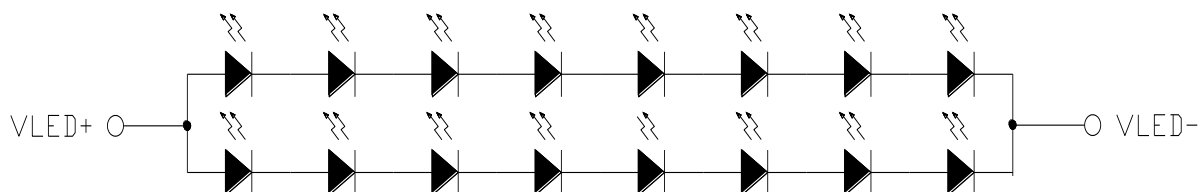
Ta = 25°C

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward Voltage	V <sub>LED</sub>	21.6	24	27.2	V	NOTE (1)
Forward current	I <sub>LED</sub>	--	40	--	mA	--
Life Time	Lf	20,000	--	--	Hrs	NOTE (2)(3)

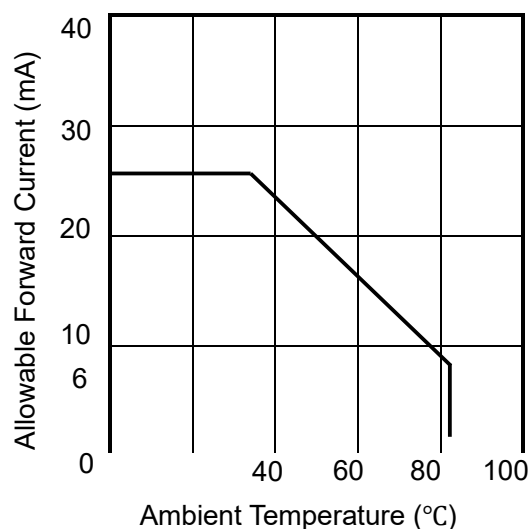
NOTE(1) : The LEDs is serial type.

NOTE(2) : The “LED life time” is defined as the module brightness decreases to 50% of original brightness that the ambient temperature is 25°C and I<sub>LED</sub>=20mA . The LED lifetime could be decreased if operating I<sub>LED</sub> is lager than 20mA.

NOTE(3) : Back-light circuit



NOTE(4) : Current reduction rate of LED backlight is according to the graph indicated below :



△ 6.3 Touch Panel Controller IC

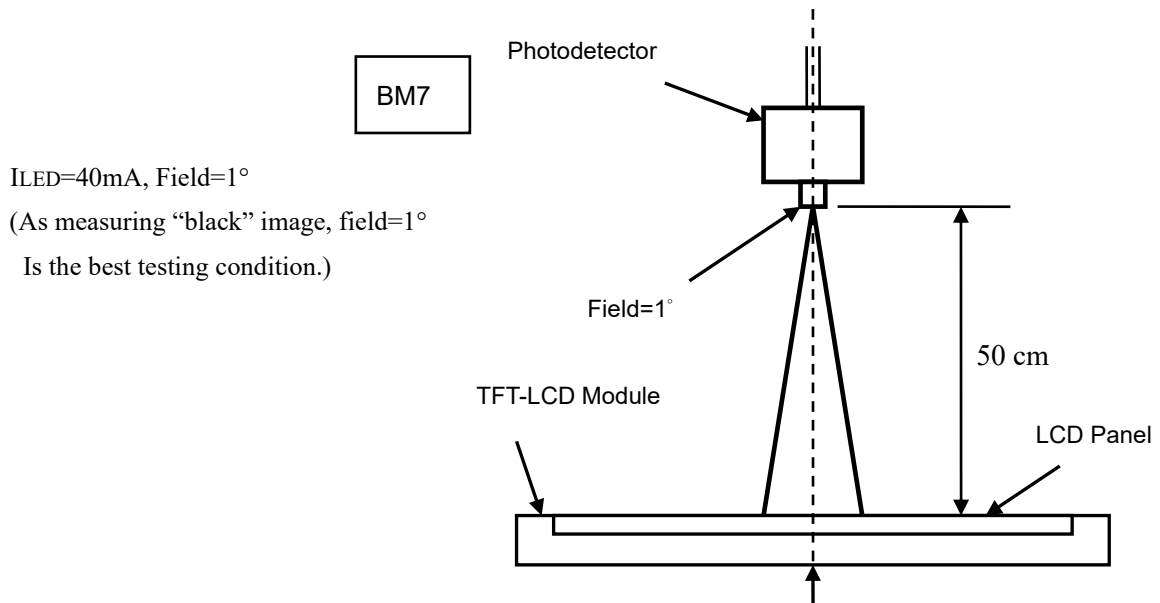
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply	VDD	2.9	3.3	3.5	V	--
Power Reset	VLVR	--	--	2.3	V	--

7. Optical characteristics

Ta = 25 °C, ILED = 40 mA

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Brightness	B	$\theta=0^\circ$ Normal viewing angle At the center of panel	750	800	--	cd/m <sup>2</sup>	(1)	
Contrast Ratio	C/R		300	500	--	--	(2)	
Response Time	Tr +Tf		--	25	50	ms	(3)	
Color chromat icity	White		Wx	(0.263)	(0.313)	(0.363)	--	--
			Wy	(0.273)	(0.323)	(0.373)		
	Red		Rx	(0.568)	(0.618)	(0.668)	--	--
			Ry	(0.293)	(0.343)	(0.393)		
	Green		Gx	(0.256)	(0.306)	(0.336)	--	--
			Gy	(0.477)	(0.527)	(0.557)		
	Blue		Bx	(0.089)	(0.139)	(0.169)	--	--
		By	(0.048)	(0.098)	(0.128)			
Viewi ng Angle	Top	$\theta_U$	40	50	--	Deg.	Good Viewing Direction (4)	
	Bottom	$\theta_D$	50	60	--		Gray Scale Inversion Direction (4)	
	Left	$\theta_L$	60	70	--		(4)	
	Right	$\theta_R$	60	70	--		(4)	
Uniformity	Un	$\theta=0^\circ$ Normal viewing angle	80	--	--	%	(5)	

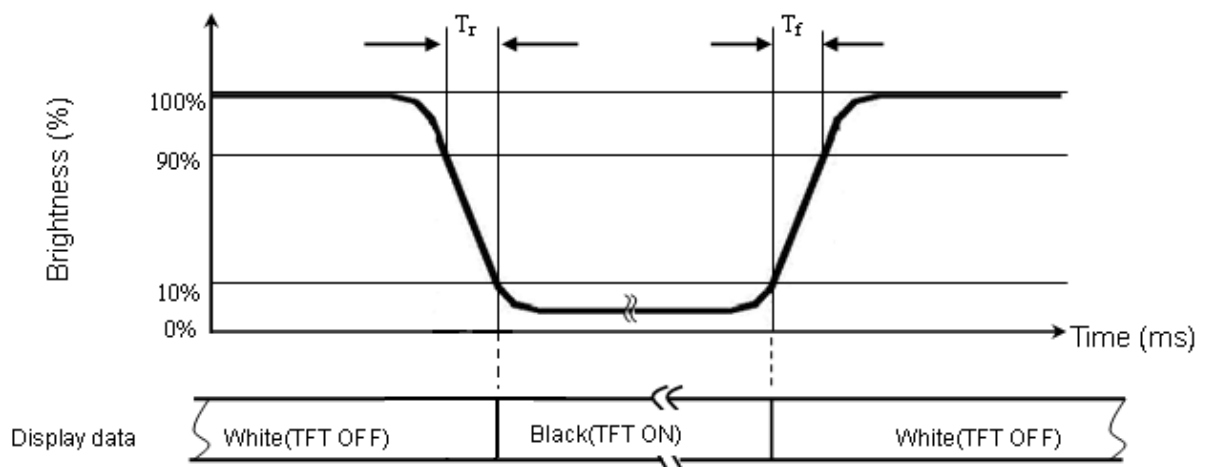
Note (1): The brightness test equipment setup



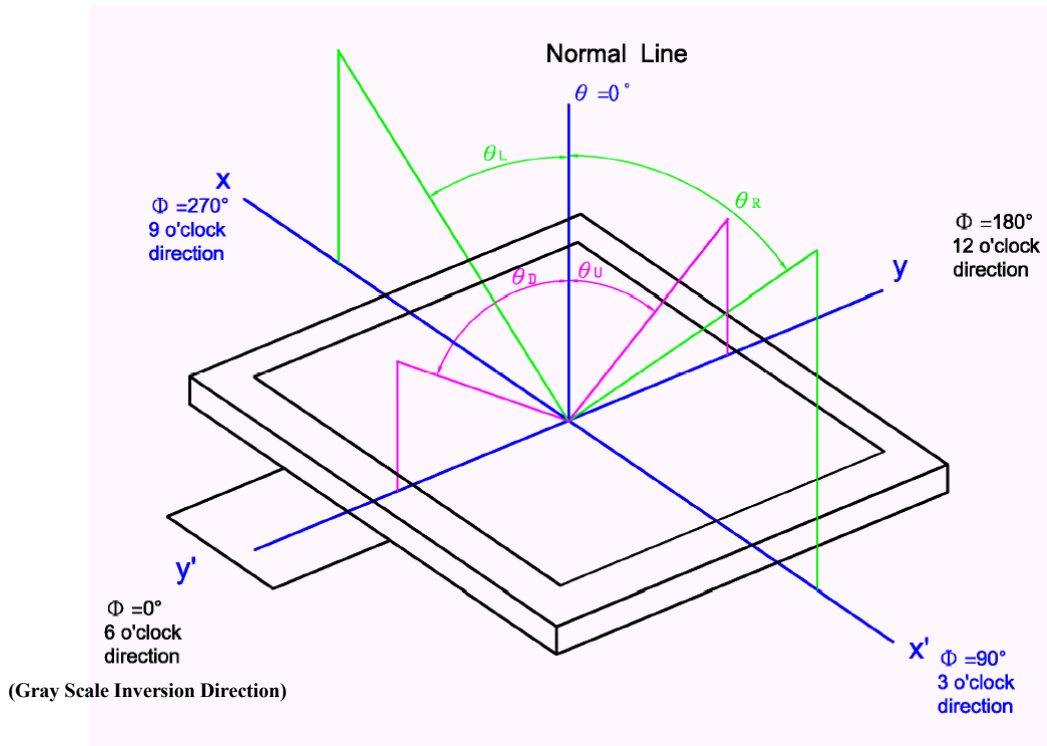
Note (2): Definition of contrast Ratio (C/R)

$$C/R = \frac{\text{Brightness When LCD is at "White" State}}{\text{Brightness When LCD is at "Black" State}}$$

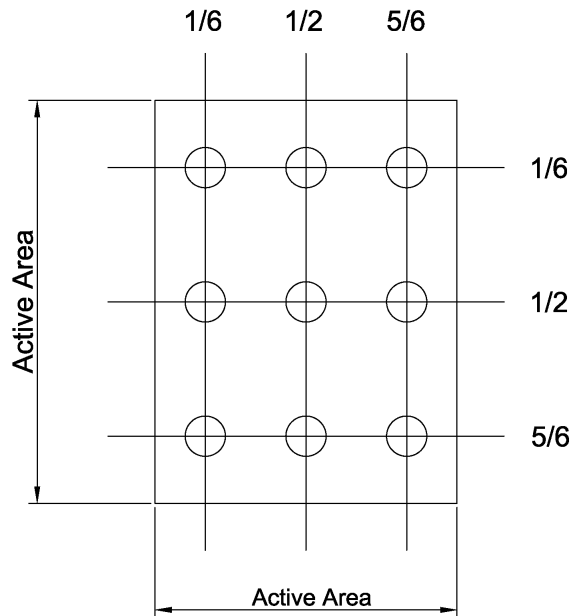
Note (3): Definition of response time



Note (4): Definition of viewing angle



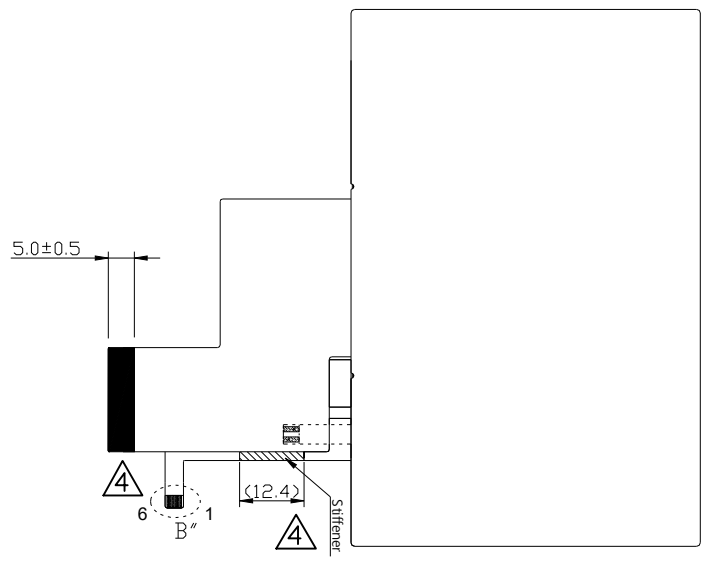
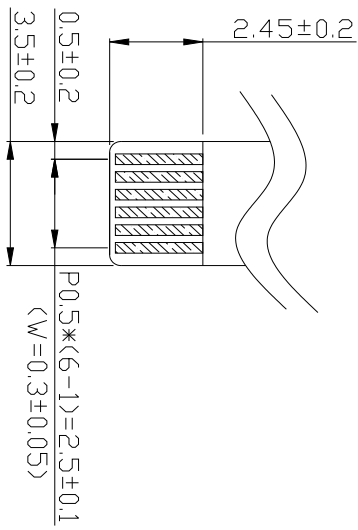
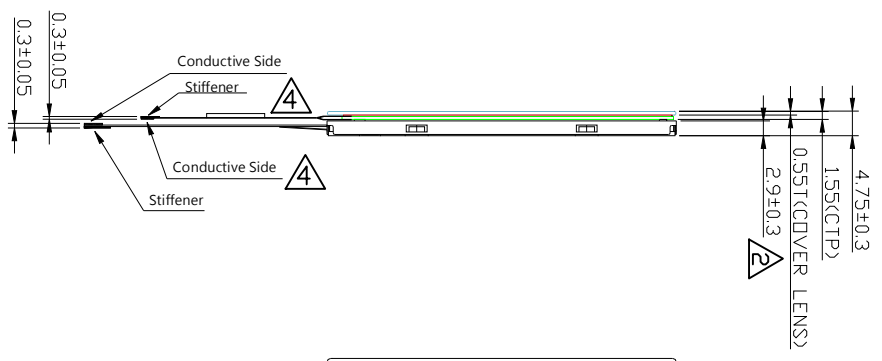
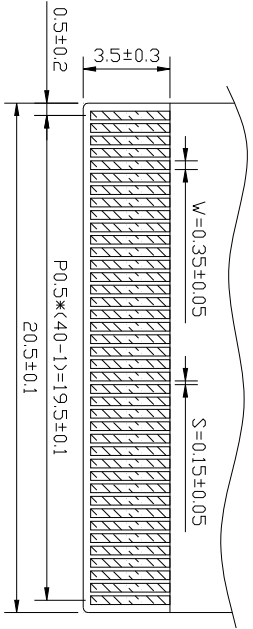
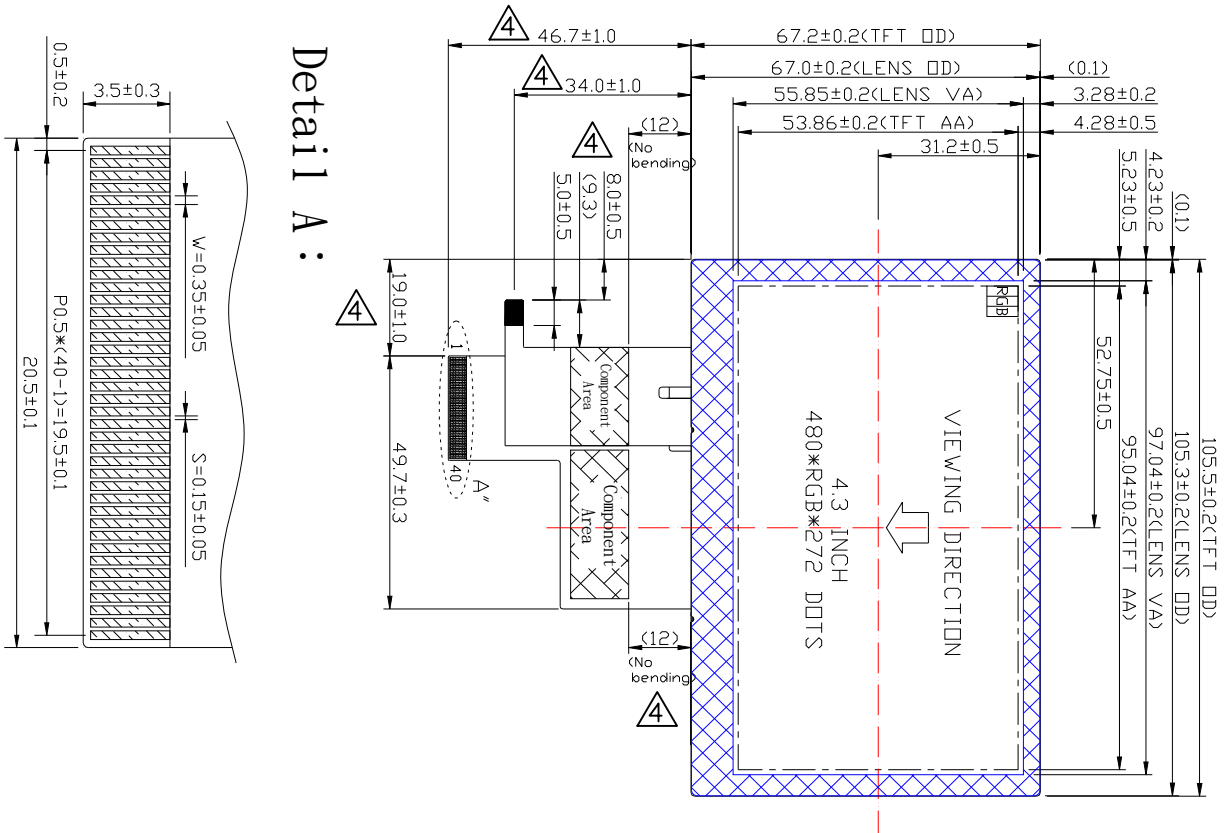
Note (5): Definition of uniformity ( $U_n$ )



$$U_n = \frac{B_{min}}{B_{max}} \times 100\%$$

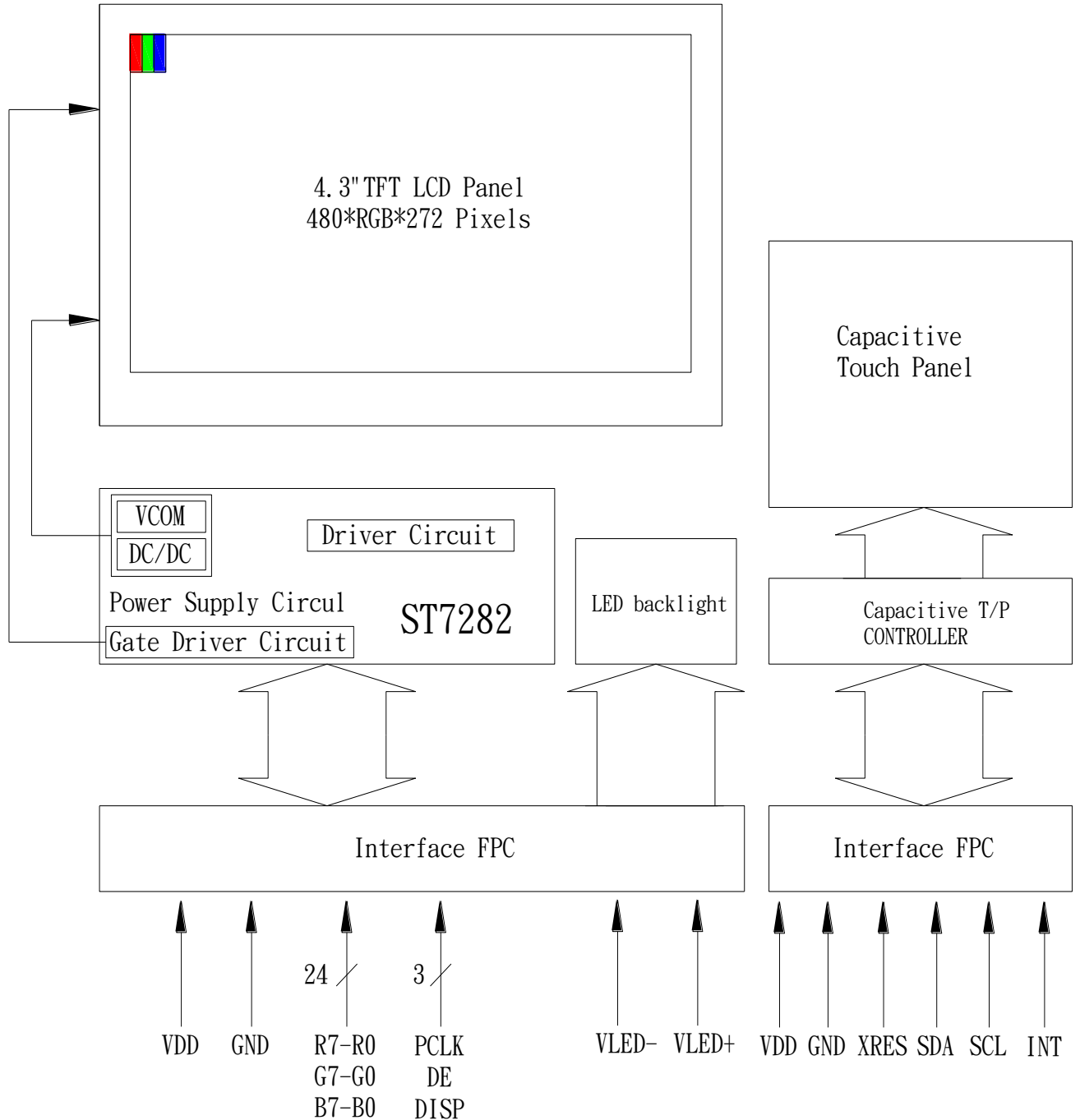


8. Outline dimension 



## 9. Block diagram

### 9.1 TFT-LCD Module (Interface System Structure)



## 10. Input Terminal Pin Assignment

### 10.1 Input Signal & Power for TFT-LCD (CN1)

Pin no	Symbol	Description	Remark
1	VLED-	LED Ground.	-
2	VLED+	LED Power.	-
3	GND	Power Ground.	-
4	VDD	Digital Power.	-
5	R0	Red data bit 0.	-
6	R1	Red data bit 1.	-
7	R2	Red data bit 2.	-
8	R3	Red data bit 3.	-
9	R4	Red data bit 4.	-
10	R5	Red data bit 5.	-
11	R6	Red data bit 6.	-
12	R7	Red data bit 7.	-
13	G0	Green data bit 0.	-
14	G1	Green data bit 1.	-
15	G2	Green data bit 2.	-
16	G3	Green data bit 3.	-
17	G4	Green data bit 4.	-
18	G5	Green data bit 5.	-
19	G6	Green data bit 6.	-
20	G7	Green data bit 7.	-
21	B0	Blue data bit 0.	-
22	B1	Blue data bit 1.	-
23	B2	Blue data bit 2.	-
24	B3	Blue data bit 3.	-
25	B4	Blue data bit 4.	-
26	B5	Blue data bit 5.	-
27	B6	Blue data bit 6.	-
28	B7	Blue data bit 7.	-
29	GND	Power Ground.	-
30	PCLK	Clock signal for data latching and internal counter of the timing controller.	-

Pin no	Symbol	Description	Remark
31	DISP	Display on/off mode control. DISP=L, standby mode. DISP=H, normal display mode.	-
32	NC	No connect	-
33	NC	No connect	-
34	DE	Data Enable Control.	-
35	NC	No connect	-
36	GND	Power Ground.	-
37	NC	No connect	-
38	NC	No connect	-
39	NC	No connect	-
40	NC	No connect	-

**10.2 Input Signal & Power for CTP(CN2)**

Pin no	Symbol	Description	Remark
1	GND	Power Ground.	-
2	SDA	I2C Serial data.	-
3	SCL	I2C Serial clock.	-
4	VDD	Power Supply	-
5	INT	Interrupt output pin.	-
6	XRES	System reset signal input, active low.	-

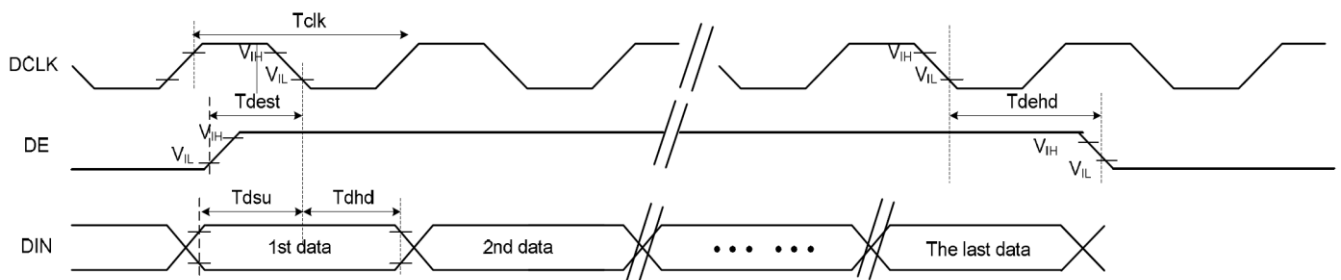
## 11. Timing Characteristics

### 11.1 AC Characteristics

AC Electrical Characteristics (VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
System operation timing						
VDD power source slew time	TPOR	-	-	20	ms	From 0V to 99% VDD
GRB pulse width	tRSTW	10	50	-	us	R=10Kohm, C=1uF
Input/ Output timing						
CLK pulse duty	Tcw	40	50	60	%	
Data setup time	Tdsu	12	-	-	ns	
Data hold time	Tdhd	12	-	-	ns	
DE setup time	Tdest	12			ns	
DE hold time	Tdehd	12			ns	
SD output stable time	Tst	-	-	12	us	Output settled within +20mV Loading = 6.8k+28.2pF.
GD output rise and fall time	Tgst	-	-	6	us	Output settled (5%~95%), Loading = 4.7k+29.8pF

### Clock and Data Input Timing Diagram



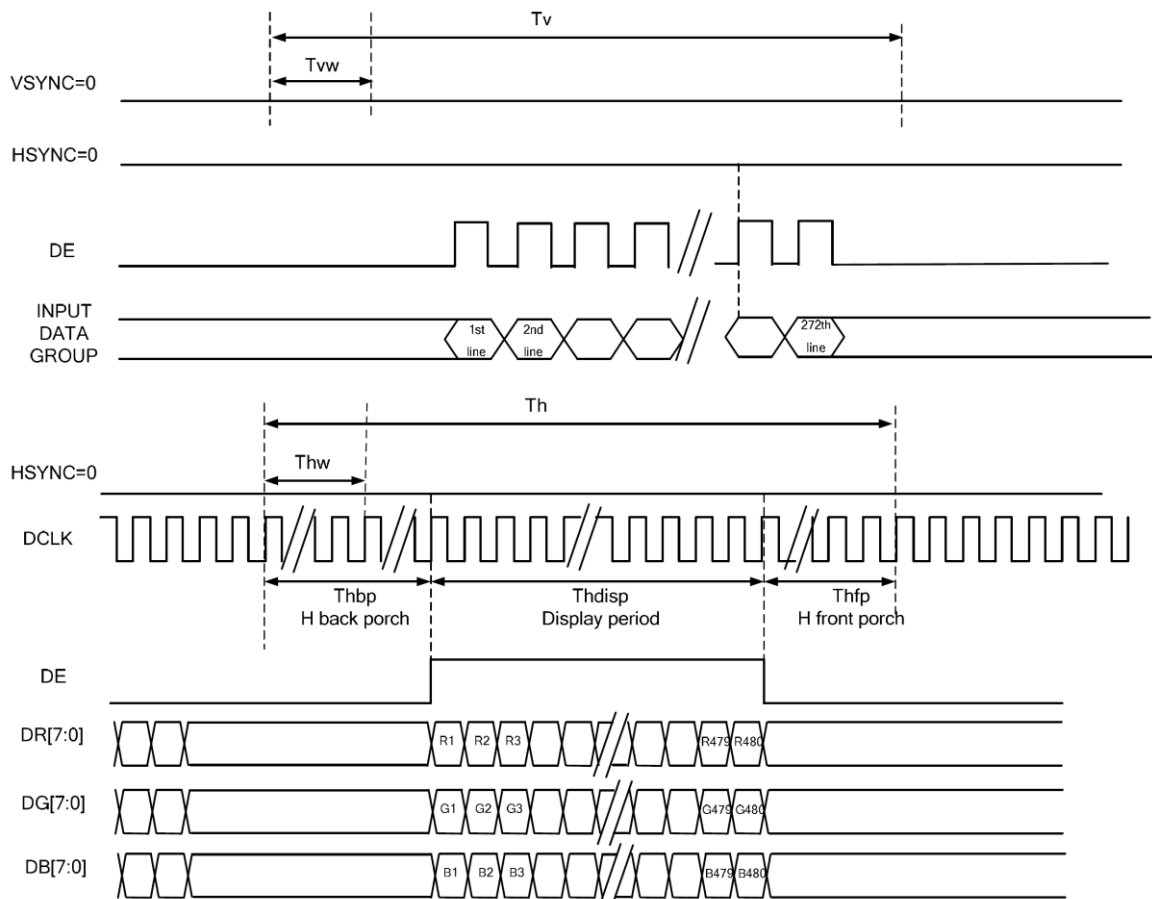
## 11.2 Timing Conditions

### Parallel RGB Input Timing Table

480RGB X 272 Resolution Timing Table							
Item	Symbol	Min.	Typ.	Max.	Unit	Remark	
DCLK Frequency	Fclk	8	9	12	MHz		
DCLK Period	Tclk	83	111	125	ns		
HSYNC	Period Time	Th	485	531	598	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	By H_Blanking setting
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	75	DCLK	
VSYNC	Period Time	Tv	276	292	321	H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12	12	H	By V_Blanking setting
	Front Porch	Tvfp	2	8	37	H	
	Pulse Width	Tvw	2	4	37	H	

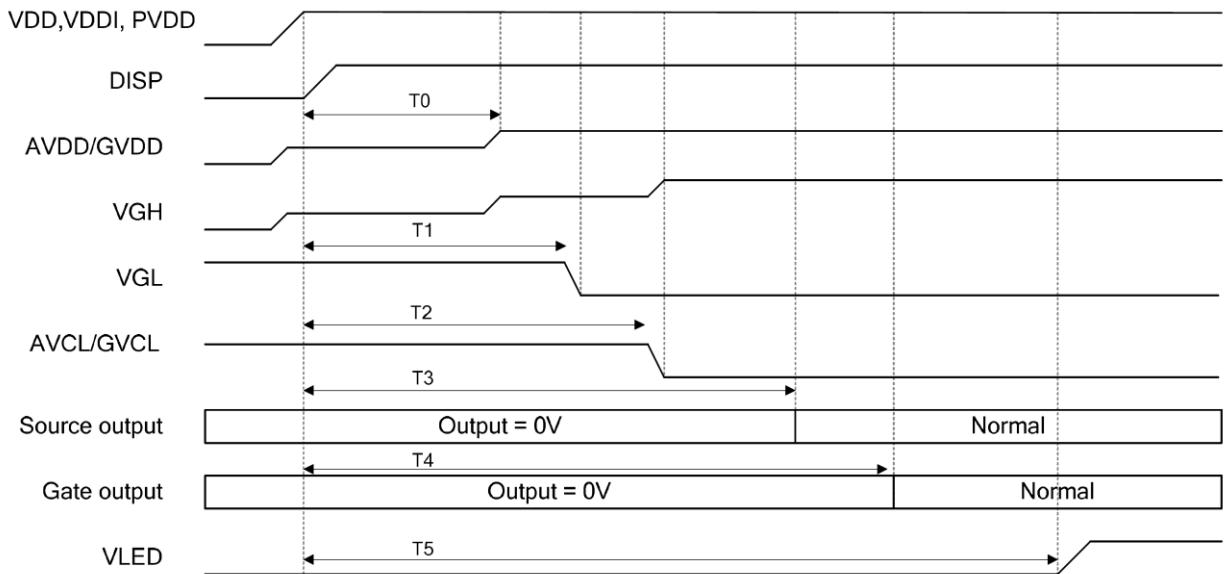
Note: It is necessary to keep  $Tvbp = 12$  and  $Thbp = 43$  in sync mode. DE mode is unnecessary to keep it.

### DE Mode Timing Diagram



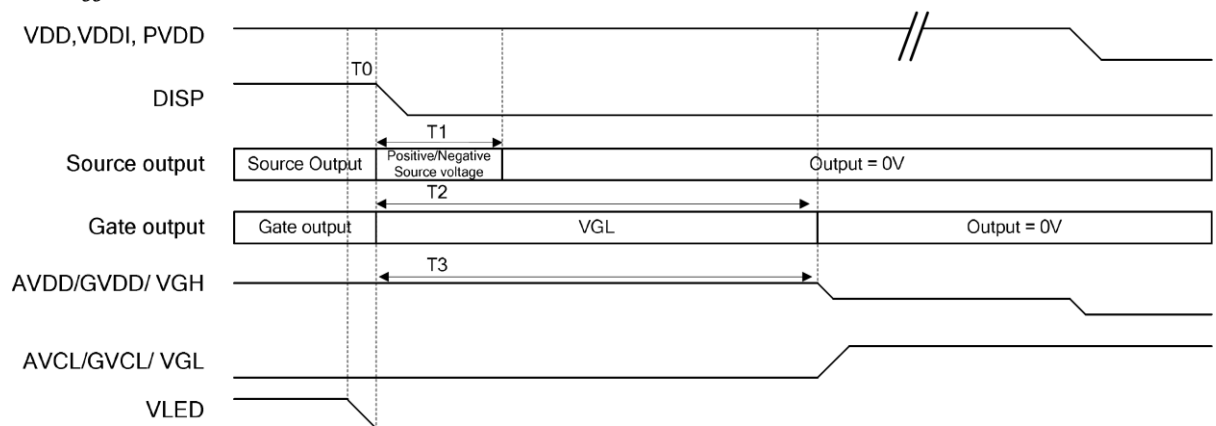
### 11.3 Power On/Off Sequence

#### Power On



Symbol	Description	Min. Time	Unit
T0	DISP="High" to AVDD/GVDD voltage stability	40	ms
T1	DISP="High" to VGL voltage stability	50	ms
T2	DISP="High" to AVCL/GVCL stability	70	ms
T3	DISP="High" to Source output	100	ms
T4	DISP="High" to Gate output	110	ms
T5	Black Turn on	130	ms

#### Power Off



Symbol	Description	Min. Time	Unit
T0	Backlight turn off to DISP="Low"	5	ms
T1	DISP="Low" to Source output disable	20	ms
T2	DISP="Low" to Gate output disable	50	ms
T3	DISP="Low" to Gate output disable	50	ms

## △ 12. Capacitive touch panel programming guide

### 12.1 Communication Interface (CN2)

Pin no	Symbol	Description	Remark
1	GND	Power Ground.	-
2	SDA	I2C Serial data.	-
3	SCL	I2C Serial clock.	-
4	VDD	Power Supply	-
5	INT	Interrupt output pin.	-
6	XRES	System reset signal input, active low.	-

※I2C Slave address is 0x55(7-bits address) for Touch IC.

### 12.2 I2C Timing Table

Reg. Addr.	Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0x12	XY0 Coord. (High Byte)	X0_H (RO)			Y0_H (RO)				
0x13	X0 Coord. (Low Byte)	X0_L (RO)							
0x14	Y0 Coord. (Low Byte)	Y0_L (RO)							
0x15	...	<i>Reserved.</i>							



### 13. Driver IC Control Algorithms

Refer to the data Sheet of LCD DRIVER ST7282.

### 14. Touch Driver IC Control Algorithms

Refer to the data Sheet of ST1633i or equivalent

### 15. Reliability Test Items

No.	Test items	Conditions	Remark
1	High temperature operation	70°C , 240hours	--
2	Low temperature operation	-20°C , 240hours	--
3	High temperature storage	80°C , 240hours	
4	Low temperature storage	-30°C , 240hours	
5	High temperature & high humidity storage	60°C , 90% RH , 240hours	--
6	Thermal Shock storage	-20°C , 30min. ~ 70°C , 30min. , 100 Cycles	--
7	Vibration test	Freq.:10~55~10~55~10 Hz, Amplitude : 1.5 mm. 2 hours for each direction of X, Y, Z	Non-operation
8	Electrostatic discharge	±2KV, Human Body Mode, 100pF / 1500Ω	Non-operation

**Criterion:** There should be no change which might affect the practical display function when the display quality test is conducted under normal operating condition.

## **16. General Precautions**

Please pay attentions to the followings as using the LCD module.

### **16.1 Handling**

- (a) Do not apply strong mechanical stress like drop, shock or any force to LCD module. It may cause improper operation, even damage.
- (b) Because the polarizer is very fragile and easy to be damaged, do not hit, press or rub the display surface with hard materials.
- (c) Do not put heavy or hard material on the display surface, and do not stack LCD modules.
- (d) If the display surface is dirty, please wipe the surface softly with cotton swab or clean cloth.
- (e) Avoid using Ketone type materials (e.g. Acetone), Toluene, Ethyl acid or Methyl chloride to clean the display surface. It might damage the polarizer permanently. The recommended solvents are water and Isopropyl alcohol.
- (f) Wipe off water droplets or oil immediately.
- (g) Protect the LCD module from ESD. It will damage the LSI and the electronic circuit.
- (h) Do not touch the output pins directly with bare hands.
- (i) Do not disassemble the LCD module.

### **16.2 Storage**

- (a) Do not leave the LCD modules in high temperature, especially in high humidity for a long time.
- (b) Do not expose the LCD modules to sunlight directly.
- (c) The liquid crystal is deteriorated by ultraviolet. Do not leave it in strong ultraviolet ray for a long time.
- (d) Avoid condensation of water. It may cause improper operation.
- (e) Please stack only up to the number stated on carton box for storage and transportation. Excessive weight will cause deformation and damage of carton box.



### ***16.3 Operation***

- (a) When mounting or dismantling the LCD modules, turn the power off.
- (b) Protect the LCD modules from electric shock.
- (c) The Driver IC control algorithms should always be obeyed to avoid damaging the LSI and electronic circuit.
- (d) Be careful to avoid mixing up the polarity of power supply for backlight.
- (e) Absolute maximum rating specified above has to be always kept in any case. Exceeding it may cause non-recoverable damage of electronic components or, nevertheless, burning.
- (f) When a static image is displayed for a long time, remnant image is likely to occur.
- (g) Be sure to avoid bending the FPC to an acute shape, it might break FPC.

### ***16.4 Others***

- (a) If the liquid crystal leaks from the panel, it should be kept away from the eyes or mouth.
- (b) For the fragility of polarizer, it is recommended to attach a transparent protective plate over the display surface.
- (c) It is recommended to peel off the protection film on the polarizer slowly so that the electrostatic charge can be minimized.

## 17. Quality and reliability

### 17.1 Test condition

Test should be conducted under the following conditions:

- (a) Ambient temperature:  $25 \pm 5^{\circ}\text{C}$
- (b) Humidity:  $55 \pm 10\% \text{ RH}$

### 17.2 Sampling plan

Sampling method shall be in accordance with MIL-STD-105D, inspection level II, normal inspection, and single sampling plan tables for normal tightened and reduced inspection.

### 17.3 Acceptable quality level

A major defect is a defect that could result in failure or materially reduce that the usability of the unit of product for its intended purpose.

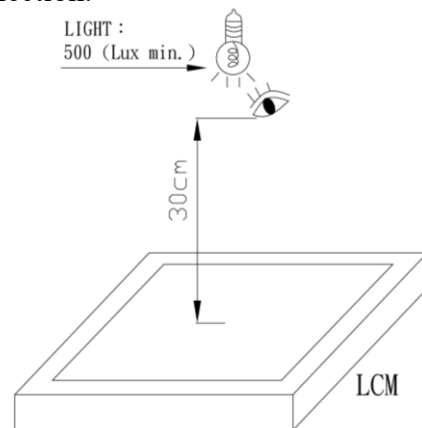
A minor defect is one that does not materially reduce the usability of the unit of product for its intended purpose or is a departure from established standards having no significant bearing on the effective use or operation of the unit.

### 17.4 Appearance

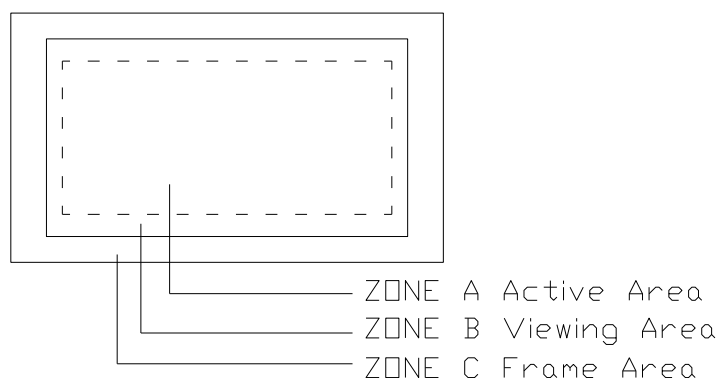
Appearance test is to be conducted by human eyes at approximately 30cm distance from LCD module under the single fluorescent light without reflection.

Condition:

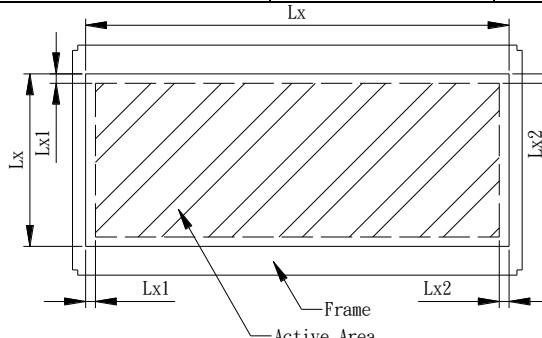
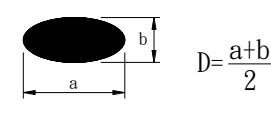
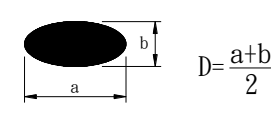
- (a) Illumination: 500 Lux min
- (b) Inspect determination: 30cm
- (c) Inspect direction: above the LCM
- (d) View angle:  $\pm 45^{\circ}$



The inspection area of LCD panel shall be within the range of following limits.



**17.5 Inspection quality criteria for TFT LCM**

ITEM	DESCRIPTION OF DEFECTS	Zone	Acceptable level (%)	
DIMENSION	Refer to individual acceptance specification	ABC	2.5	
SLANT	Viewing Area	$ Lx1-Lx2 $	Judgment	
	$Lx \leq 100\text{mm}$	$\leq 0.2\text{mm}$	ACC	
	$100\text{mm} < Lx \leq 150\text{mm}$	$\leq 0.3\text{mm}$	ACC	
	$150\text{mm} < Lx \leq 200\text{mm}$	$\leq 0.4\text{mm}$	ACC	
	$200\text{mm} < Lx$	$\leq 0.5\text{mm}$	ACC	
				
LINE DEFECT ON SURFACE (SCRATCHES, BLACK/WHITE LINE)	(a) $L \leq 5\text{mm}$ & $W \leq 0.015\text{mm}$ , disregard (b) $L \leq 2\text{mm}$ & $0.015\text{mm} < W \leq 0.025\text{mm}$ , $N \leq 2$ (c) $L \leq 1\text{mm}$ & $0.025\text{mm} \leq W \leq 0.05\text{mm}$ , $N \leq 1$ (d) $L > 2\text{mm}$ or $W > 0.05\text{mm}$ , REJ (e) Distance between 2 lines $\geq 10\text{mm}$	A	2.5	
SPOT DEFECT ON SURFACE (BLACK/WHITE SPOT)	Average diameter, D (a) $D \leq 0.15\text{mm}$ , disregard (b) $0.15\text{mm} < D \leq 0.3\text{mm}$ , $N \leq 2$ .ACC (c) $D > 0.3\text{mm}$ , REJ (d) Distance between 2 spots $\geq 10\text{mm}$		A	2.5
PROTRUDE DOT/ DENT ON SURFACE	Average diameter D (a) $D \leq 0.2\text{mm}$ , disregard (b) $0.2\text{mm} < D \leq 0.3\text{mm}$ , $N \leq 2$ .ACC (c) $0.3\text{mm} < D \leq 0.5\text{mm}$ , $N \leq 1$ .ACC (d) $D > 0.5\text{mm}$ , REJ (e) Distance between 2 protrude dot/ dent $\geq 10\text{mm}$		A	2.5
POLARIZER EDGE	BUBBLES、DENTS、RESIDUAL GLUE、DECKLE EDGE : Active Area outside area don't care.	A,B	2.5	

NOTE(1): ACC : Accept

NOTE(2): REJ : Reject

ITEM	DESCRIPTION OF DEFECTS	Zone	Acceptable level (%)																					
DAMAGE	(a) Lead side of TFT LCM FPC lead electrical line can't be damage, except dummy electrical line and alignment mark.	A	0.65																					
	(b) Non-lead side of TFT LCM Damage area L * 2.5mm, W* 0.7mm, ACC																							
BRIGHT/ DARK POINT	<table border="1"> <thead> <tr> <th>Item</th> <th>Allow number in Area A</th> </tr> </thead> <tbody> <tr> <td rowspan="4">(a) Bright point</td> <td>Single point</td> <td>2</td> </tr> <tr> <td>Two adjacent point</td> <td>0</td> </tr> <tr> <td>Three adjacent point</td> <td>0</td> </tr> <tr> <td>Total point</td> <td>2</td> </tr> <tr> <td rowspan="4">(b) Dark point</td> <td>Single point</td> <td>3</td> </tr> <tr> <td>Two adjacent point</td> <td>0</td> </tr> <tr> <td>Three adjacent point</td> <td>0</td> </tr> <tr> <td>Total point</td> <td>3</td> </tr> </tbody> </table>		Item	Allow number in Area A	(a) Bright point	Single point	2	Two adjacent point	0	Three adjacent point	0	Total point	2	(b) Dark point	Single point	3	Two adjacent point	0	Three adjacent point	0	Total point	3	A	2.5
	Item	Allow number in Area A																						
	(a) Bright point	Single point	2																					
		Two adjacent point	0																					
		Three adjacent point	0																					
		Total point	2																					
	(b) Dark point	Single point	3																					
Two adjacent point		0																						
Three adjacent point		0																						
Total point		3																						
※ Point : A sub pixel 1R or 1G or 1B ※ The distance of bright or dark point > 5mm																								
CHROMA MURA	Not allowed if it can be observed through ND Filter 6%. Refer to individual acceptance limited sample	A	2.5																					
COLOR NOT ACCORD	Not allowed if it can be observed through ND Filter 6%. Refer to individual acceptance limited sample	A	2.5																					
DISPLAY ABNORMAL	(a) Non display (b) Line defect (c) Response time, contrast ratio, brightness or viewing angle abnormal (d) Water ripple (e) Flicker	A	0.65																					

NOTE(1): ACC : Accept

NOTE(2): REJ : Reject