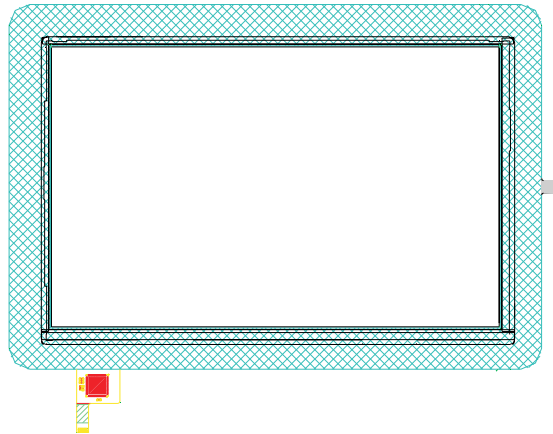




PRODUCT SPECIFICATION

HDA1010WPT-S-WV

10.1", TFT WXGA (1280X800) COLOR
LCD DISPLAY MODULE



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1. General Specifications

No.	Item	Specification	Remark
1	LCD size	10.1 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1280 × 3(RGB) × 800	
4	Display mode	Normally Black, Transmissive	
5	Dot pitch	0.0565(W) × 0.1695(H) mm	
6	Active area	216.96(W) × 135.60(H) mm	
7	Module size	258(W) × 176.6(H) × 4.95(D) mm	Note 1
8	Surface treatment	HC	
9	Color arrangement	RGB-stripe	
10	Interface	Digital	
11	Backlight power consumption	1.92 W(Typ.)	
12	Panel power consumption	0.7W(Typ.)	Note 2
13	Weight	0.193KG(Typ.)	

Note 1: Refer to Mechanical Drawing.

Note 2: Including T-con Board power consumption

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2. Pin Assignment

A 40pin connector is used for the module electronics interface. The recommended model is F62240-H1210A manufactured by Vigorconn.

Pin No.	Symbol	I/O	Function	Remark
1	VCOM	P	Common Voltage	
2	VDD	P	Power Supply	
3	VDD	P	Power Supply	
4	NC	---	No connection	
5	NC	---	No connection	
6	NC	---	No connection	
7	GND	P	Ground	
8	Rxin0-	I	-LVDS Differential Data Input	R0-R5, G0
9	Rxin0+	I	+LVDS Differential Data Input	
10	GND	P	Ground	
11	Rxin1-	I	-LVDS Differential Data Input	G1~G5, B0,B1
12	Rxin1+	I	+LVDS Differential Data Input	
13	GND	P	Ground	
14	Rxin2-	I	-LVDS Differential Data Input	B2-B5,HS,VS, DE
15	Rxin2+	I	+LVDS Differential Data Input	
16	GND	P	Ground	
17	RxCLK-	I	-LVDS Differential Clock Input	LVDS CLK
18	RxCLK+	I	+LVDS Differential Clock Input	
19	GND	P	Ground	
20	Rxin3-	I	-LVDS Differential Data Input	R6, R7, G6, G7, B6, B7
21	Rxin3+	I	+LVDS Differential Data Input	
22	GND	P	Ground	
23	NC	---	No connection	
24	NC	---	No connection	
25	GND	P	Ground	
26	NC	---	No connection	

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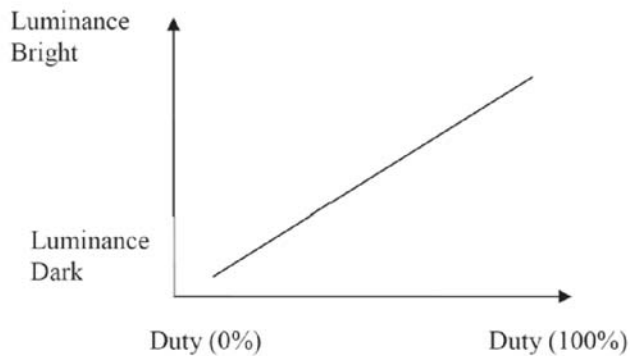
27	LED_PWM	O	CABC controller signal output for backlight	Note2
28	NC	---	No connection	
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	NC	---	No connection	
34	NC	---	No connection	
35	VGL	P	Gate OFF Voltage	
36	NC	---	No connection	
37	CABC_EN	I	CABC Enable Input	Note1
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

I: input, O: output, P: Power

Note1: The setting of CABC function are as follows.

Pin	Enable	Disable
CABC_EN	High Voltage	Low Voltage or open

Note2: LED_PWM is used to adjust backlight brightness.



3. Operation Specifications

3.1. Absolute Maximum Ratings

(Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	VDD	-0.3	3.9	V	
	AVDD	-0.3	14	V	
	V _{GH}	-0.3	42.0	V	
	V _{GL}	-19	0.3	V	
	V _{GH} -V _{GL}	12	40.0	V	
Operation Temperature	T _{OP}	-0	50	°C	
Storage Temperature	T _{ST}	-20	60	°C	
LED Reverse Voltage	V _F	2.7	3.1	V	I _F =20mA
LED Forward Current	I _R	---	50	mA	V _R =5V

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

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3.1.1. Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I_{GH}	-	705	750	μA	$V_{GH} = 22V$
	I_{GL}	-	705	750	μA	$V_{GL} = -7V$
	$I_{V_{DD}}$	-	95	120	mA	$V_{DD} = 2.5V$
	$I_{AV_{DD}}$	-	45	70	mA	$AV_{DD} = 8.2V$

3.1.2. Backlight Driving Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	V_L	8.1	(8.8)	9.3	V	Note 1
Current for LED backlight	I_L	180	200	220	mA	
LED life time	-	15000		-	Hr	Note 2

Note 1: The LED Supply Voltage is defined by the number of LED at $T_a = 25^\circ C$ and $I_L = 200mA$.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a = 25^\circ C$ and $I_L = 200mA$. The LED lifetime could be decreased if operating I_L is larger than 200mA.

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3.2. Typical Operation Conditions

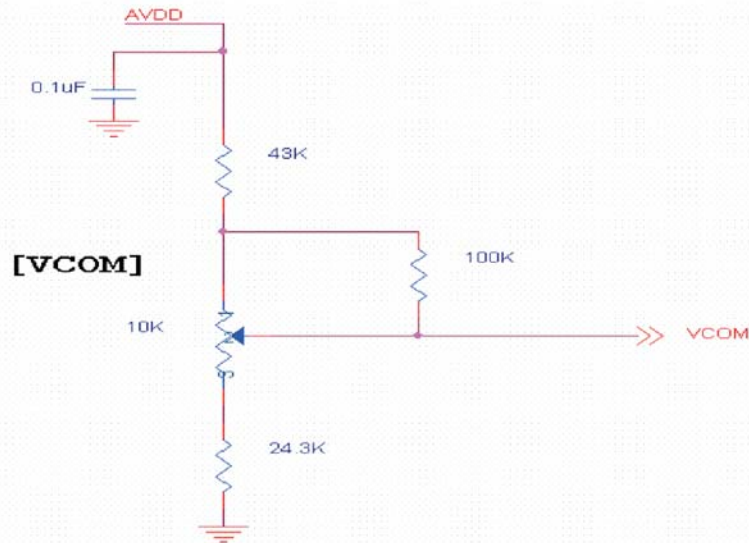
(Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	VDD	2.3	2.5	2.7	V	Note 2
	AVDD	8.0	8.2	8.4	V	
	V _{GH}	21.7	22	22.3	V	
	V _{GL}	-7.3	-7	-6.7	V	
Input signal voltage	VCOM	2.7	3.0	3.3	V	Note 4
Input logic high voltage	V _{IH}	0.8 VDD	-	3.6	V	Note 3
Input logic low voltage	V _{IL}	0	-	0.2 DV _{DD}	V	

Note 1: Be sure to apply VDD and V_{GL} to the LCD first, and then apply V_{GH}.

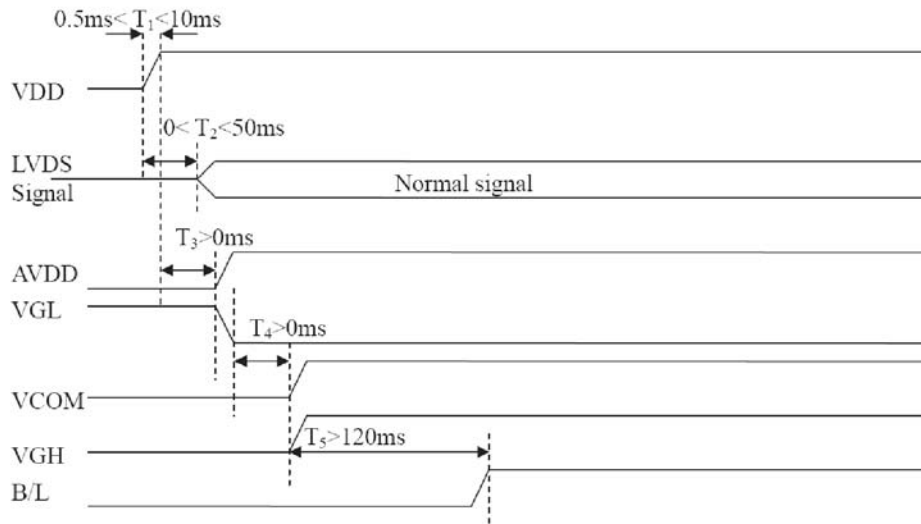
Note 2: VDD setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 4: Typical VCOM is only a reference value, it must be optimized according to each LCM. Be sure to use VR.

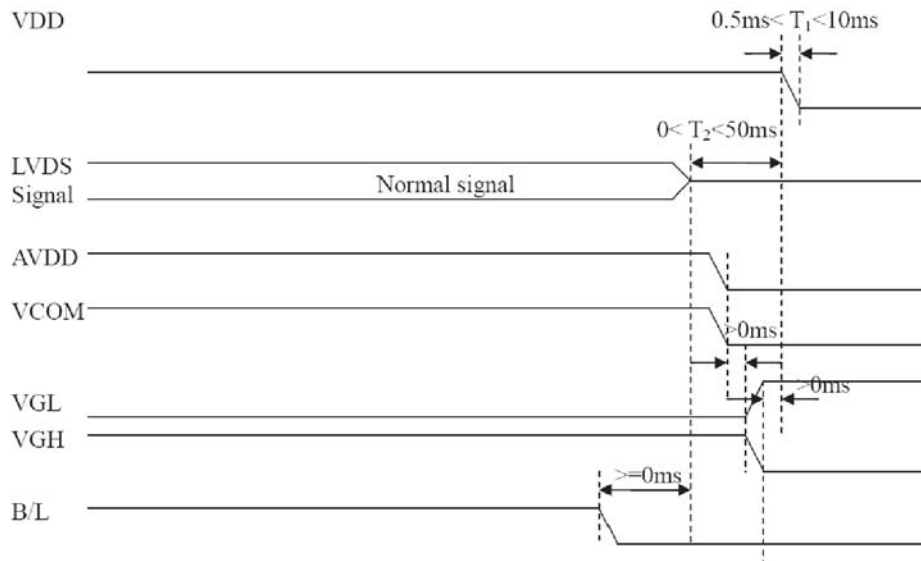


3.3. Power Sequence

a. Power on:



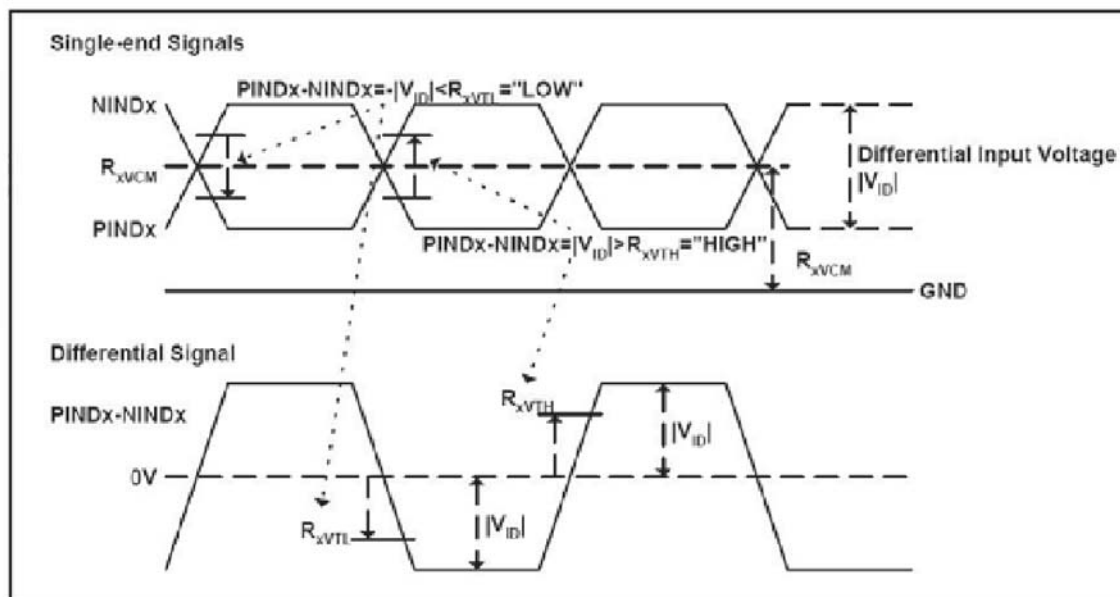
b. Power off:



3.4. LVDS Signal Timing Characteristics

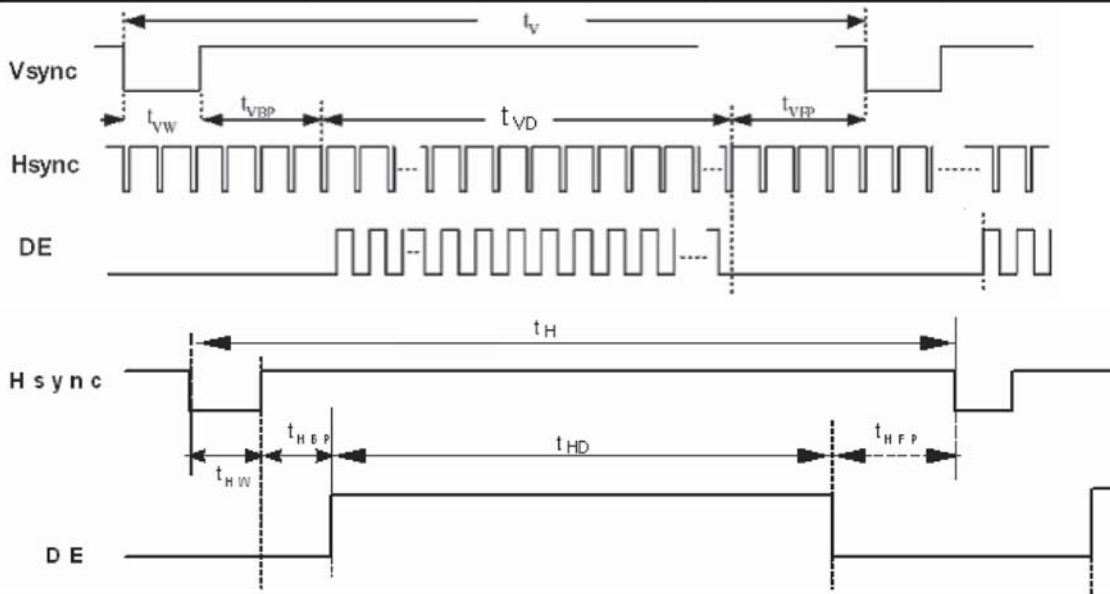
3.4.1. AC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LVDS Differential input high Threshold voltage	R_{xVTH}	-	-	+100	mV	$R_{xVCM}=1.2V$
LVDS Differential input low Threshold voltage	R_{xVTL}	-100	-	-	mV	
LVDS Differential input common mode voltage	R_{xVCM}	0.7	-	1.6	V	
LVDS Differential voltage	$ V_{ID} $	200	-	600	mV	

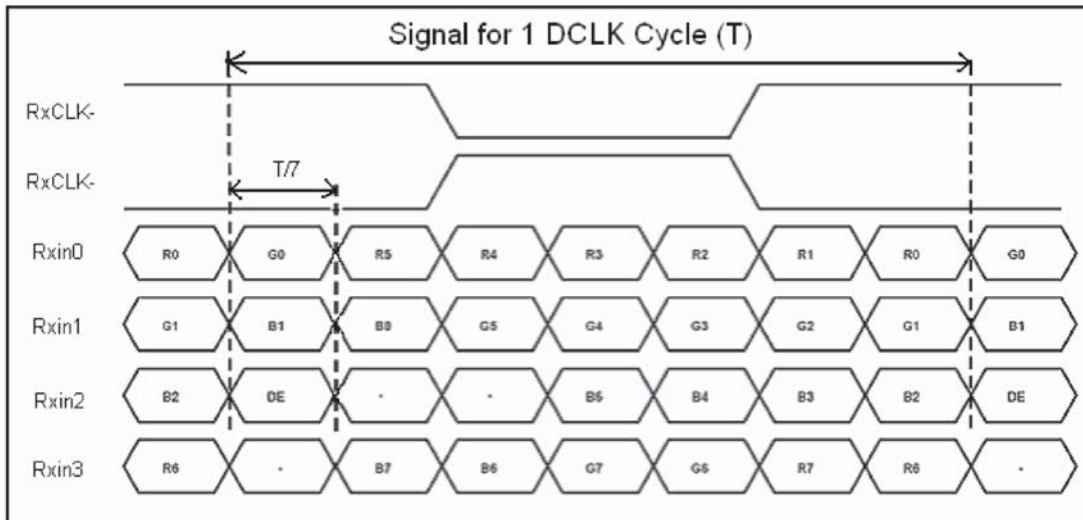


3.4.2. Timing Table

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	1/Tc	68.9	71.1	73.4	MHz	Frame rate =60Hz
Horizontal display area	tHD	1280			Tc	
HS period time	tH	1410	1440	1470	Tc	
HS Width +Back Porch +Front Porch	tHW+ tHBP +tHFP	130	160	190	Tc	
Vertical display area	tVD	800			tH	
VS period time	tV	815	823	833	tH	
VS Width +Back Porch +Front Porch	tVW+ tVBP +tVFP	15	23	33	tH	



3.4.3. LVDS Data Input Format



4. Optical Specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR \geq 10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	75	85	-	degree	Note 1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	75	85	-		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	75	85	-		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	75	85	-		
Response time	T_{ON}	Normal $\theta=\Phi=0^\circ$	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	Note 3
Contrast ratio	CR		600	800	-	-	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2
	W_Y		0.28	0.33	0.38	-	Note 5 Note 6
Luminance	L		261	304.5	-	cd/m ²	Note 6
Luminance uniformity	Y_U		75	80	-	%	Note 7

Test Conditions:

1. VDD=2.5V,the ambient temperature is 25°C..
2. The test systems refer to Note 2.

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Note 1: Definition of viewing angle range

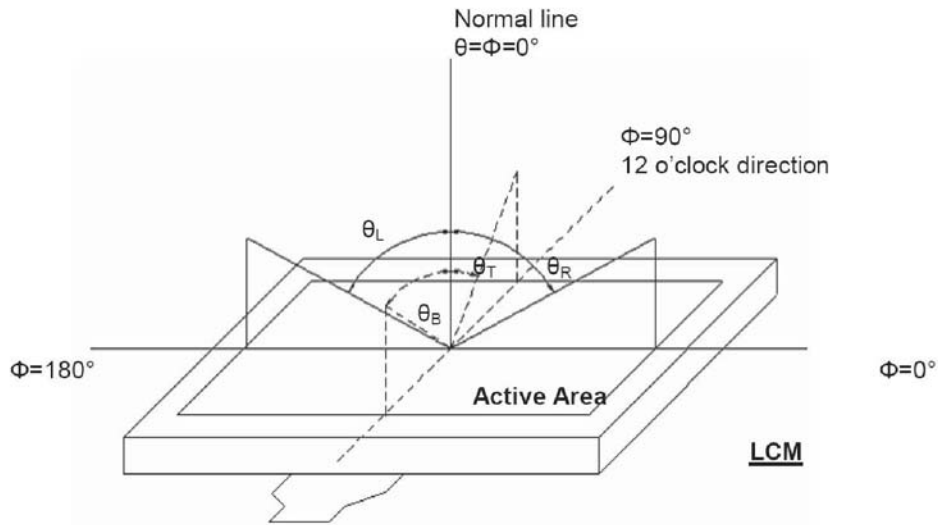


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm, Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/ Field of view: 1° /Height: 500mm.)

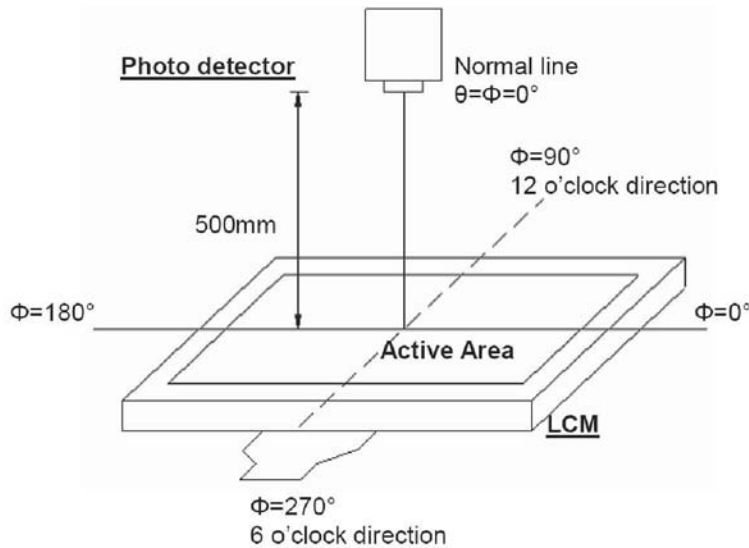


Fig. 4-2 Optical measurement system setup

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Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

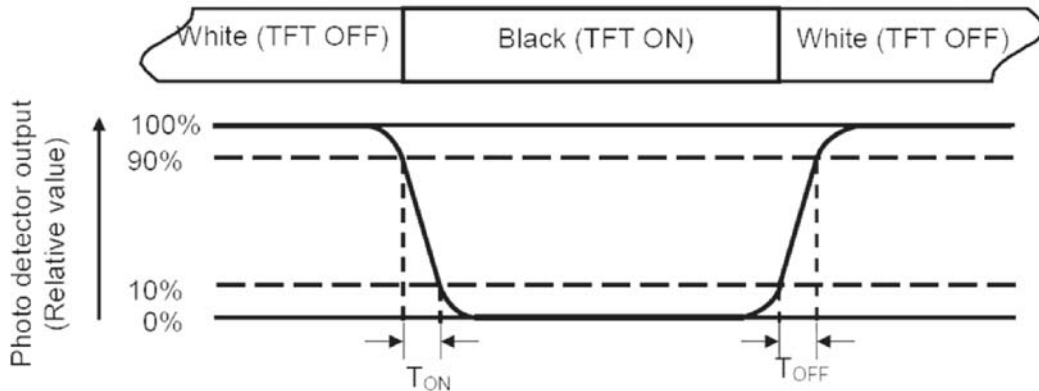


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

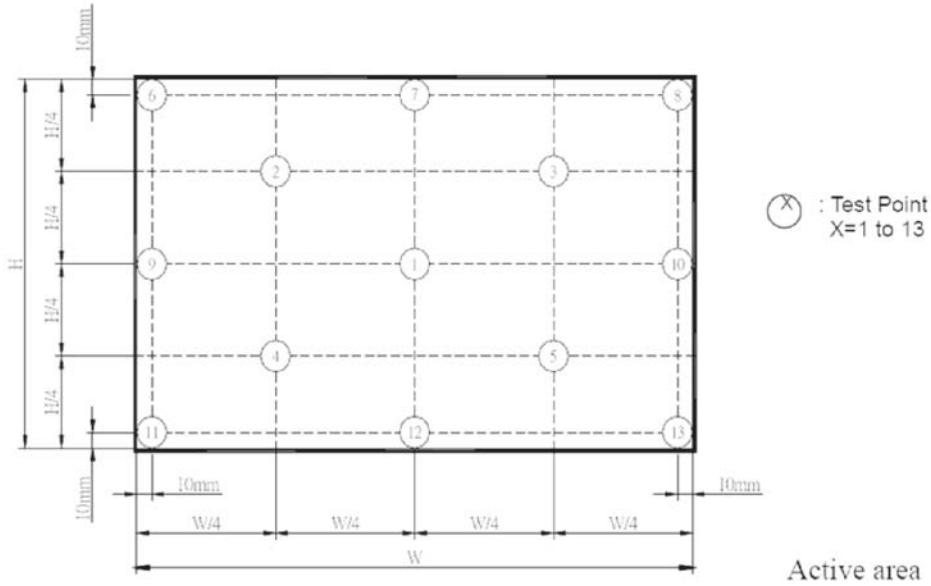
Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is $I_L=200\text{mA}$.

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Note 7: Definition of Luminance Uniformity

Measure the luminance of gray level 63 at 9 points

$$\delta W_{9p} = \frac{\text{Minimum [L (1)+ L (6)+ L (7)+ L (8)+ L (9)+ L (10)+ L (11) +L (12) +L (13)]}}{\text{Maximum [L (1)+ L (6)+ L (7)+ L (8)+ L (9)+ L (10)+ L (11) +L (12) +L (13)]}} * 100\%$$



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5. Reliability Test Items

(Note3)

Item	Test Conditions	Remark
High Temperature Storage	Ta = 60°C 120hrs	Note 1, Note 4
Low Temperature Storage	Ta = -20°C 120hrs	Note 1, Note 4
High Temperature Operation	Ts = 50°C 120hrs	Note 2, Note 4
Low Temperature Operation	Ta = 0°C 120hrs	Note 1, Note 4
Operate at High Temperature and Humidity	+40°C, 90%RH 120hrs	Note 4
Thermal Shock	-20°C/30 min ~ +60°C/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.	Note 4
Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
Mechanical Shock	100G 6ms,±X, ±Y, ±Z 3 times for each direction	
Package Vibration Test	Random Vibration : ISTA-3A 1Hz~200Hz,Grms=0.53 Half hours for direction of Z.	
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	
Electro Static Discharge	± 2KV, Human Body Mode, 100pF/1500Ω	

Note 1: Ta is the ambient temperature of samples.

Note 2: Ts is the temperature of panel's surface.

Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

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7. Standard Specifications for Product Quality

一、 Inspection condition :

1、 Appearance Inspection

Temperature: $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$

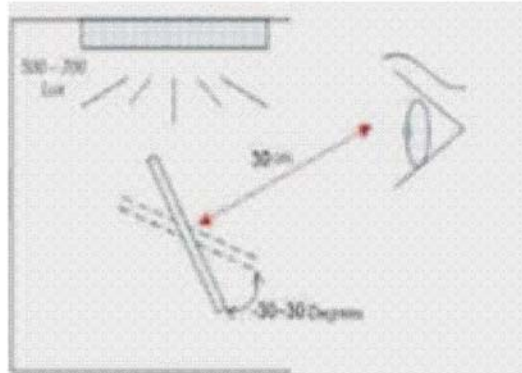
Humidity: $55 \pm 5\text{RH}\%$

Luminance: 40W daylight lamp

Inspection Distance: $30\text{CM} \pm 5\text{CM}$

Inspection Angle : $10^{\circ} - 30^{\circ}$

Inspection Time: 5S-10S



2、 Function Inspection

Use specialized instrument

二、 Sample Project and Standard can be Accepted

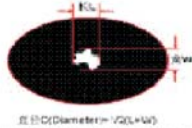
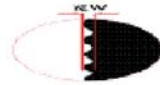
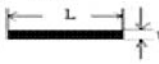
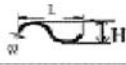

Sample Project and Standard can be Accepted

Employ normal inspection project, inspect once, according to GB/T2828-2003 II project

	Defect	Check Level	AQL
MAJOR (MA)	1.LIQUID CRYSTAL LEAKAGE 2.WRONG POLARIZER 3.OUTSIDE DIMENSION 4.SEGMENT MISSING 5.SEGMENT SHORT 6.DISPLAY ABNORMALLY 7.NO BACK-LIGHT	II	0.65
MINOR (MI)	1.BLACK SPOTS OR WHITE SPOTS. 2.FOREIGN SUBSTANCE, 3.WHITE SPOTS, 4.PINHOLE,SEGMENT 5.DEFORMATION SCRATCHS(GLASS & POLARIZER), 6.SEGMENT DEFECT, 7.AIR BUBBLES BETWEEN GLASS & POLARIZER, 8.COLOR VARIATION,GLASS CHIPS, 9.OTHER VISUAL DEFECTS.	II	2.5

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三、 Inspection standard for product

1. Appearance standard (unit: mm)		
Items	Criterion	Checking manner
Pin Hole in BM  <p>$D \leq 0.10\text{mm}$ No Check $0.10\text{mm} < D \leq 0.2\text{mm}$ $N \leq 2$ (distance $\geq 5\text{mm}$) $D > 0.2\text{mm}$ $N = 0$</p>	Film	Checking With Eyes /Film
Burr on BM edge  <p>$W \leq 0.10\text{mm}$</p>		
Scratch, Black Line white Line   <p>$W \leq 0.07\text{mm}$ L---- No Check $0.07\text{mm} \leq W \leq 0.10\text{mm}$ $L \leq 5$ $N \leq 4$ $0.1\text{mm} < W$ OR $L > 5$ Not allowed</p>	Checking With Eyes	Checking With Eyes
BM peel off <p>Not allowed</p>		
Rainbow Color <p>Allow tiny rainbow Allow 5% color contrast or accord limitative sample The color need to according to the limit sample</p>	Film	Checking With Eyes
Dot defect state (Particles, Scratch , bubbles, bright spot , Black/white spot , Light leak, glue /ink residual)  <p>$D \leq 0.3\text{mm}$ No Check $0.3\text{mm} < D \leq 0.5\text{mm}$ $N \leq 4$ $0.5\text{mm} < D$ $N = 0$ $SUM \leq 6$</p>		
Broken corner Broken side <p>Flaw is not allowed 1:Front side: $S \leq 0.2 \text{ mm}^2$, $N \leq 2$, $d \geq 5\text{mm}$ 2:Back side: $S \leq 0.3 \text{ mm}^2$, $N \leq 4$, $d \geq 5\text{mm}$ 3: If this phenomenon can be seen on both front side and back side, judge it by the front side</p>	Checking With Eyes	Checking With Eyes
FPC <p>No damage or oxidization on metal PIN No sharp fold</p>		
Newton Ring <p>According to the Criterion that we all agreed</p>	Checking With Eyes / Film	Checking With Eyes / Film
Bubbles of the protection foil <p>No dust in bubbles of the Protection foil $D \leq 2.0\text{mm}$ No Check $2.0\text{mm} < D \leq 3.0\text{mm}$ $N = 3$ $D > 3.0\text{mm}$ Not allowed</p>		

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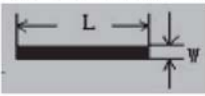
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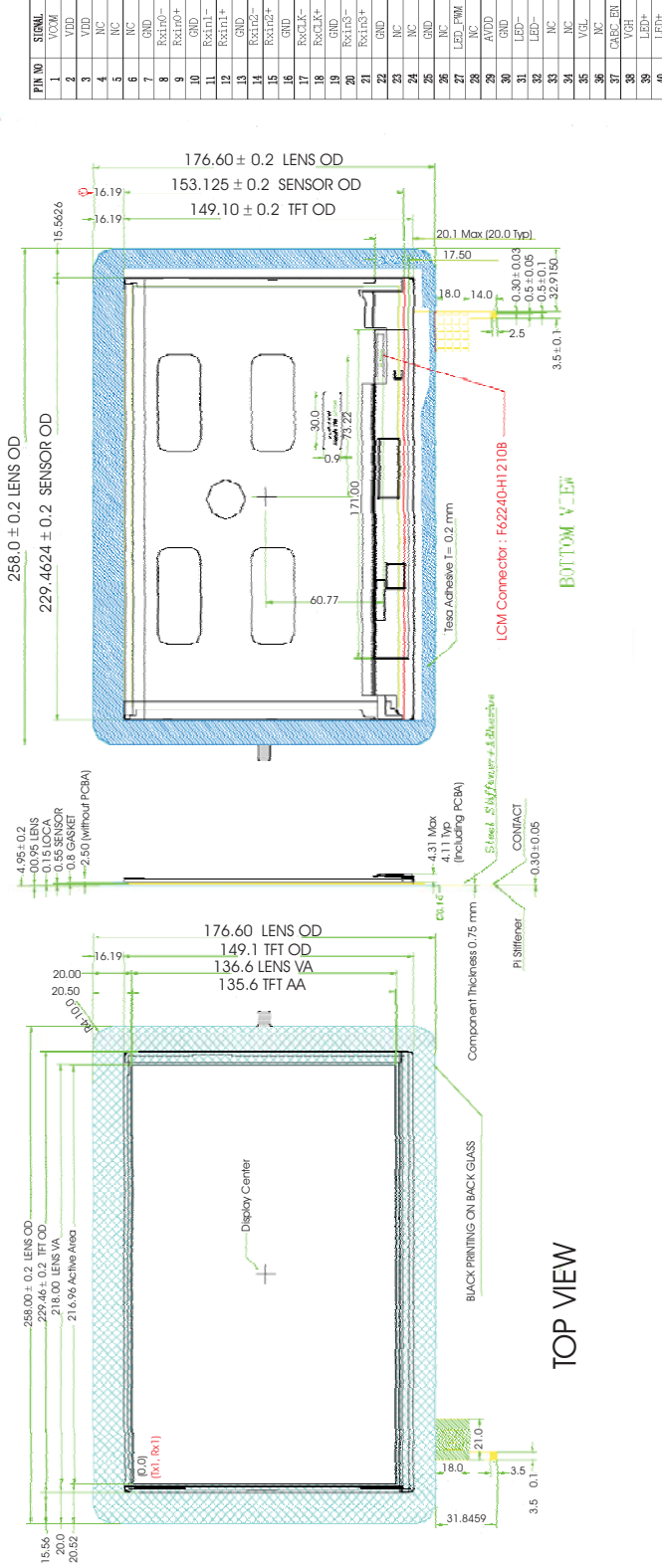
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2、Function standard		
Dot defect state		
Items	illustration	Criterion
Bright spot	At BLACK appearance, bright and size constant of dot is seen by eyes.	$N \leq 3$
Black spot	At RED、GREEN、BLUE appearance, dark and size constant of dot is seen by eyes.	$N \leq 4$
Total bright and Dark Dots		$N \leq 6$
Items	Criterion	Checking manner
No display, Display abnormally, Missing vertical/horizontal segment, Short circuit, Back-light no lighting, Back-light Flickering	Not allowed	Checking With Eyes
Particles, Scratch , bubbles, bright spot , Black/white spot , Light leak , glue /ink residual	$D \leq 0.3 \text{ mm}$ No Check $0.3 \text{ mm} < D \leq 0.5 \text{ mm}$ $N \leq 4$ $0.5 \text{ mm} < D$ $N \leq 0$	Checking With Eyes
	Sum of defects ≤ 4	
 $D = (W+L) / 2$		
Black Line/white Line	$W \leq 0.07 \text{ mm}$ $L \text{ ---}$ No Check $L \leq 5.0 \text{ mm}$ $0.07 \text{ mm} < W \leq 0.10 \text{ mm}$ $N \leq 4$ $0.1 \text{ mm} < W \text{ 或 } L > 5 \text{ mm}$ $N = 0$	Checking With Eyes
 L W		



1 Operating Voltage:	VDD = 3.3V
2 Resolution:	1280*800/RGB
3 Color:	16.7M
4 Interface:	LVDS
5 Display Type:	Transmissive
6 Viewing Direction:	All
7 Operating Temp:	0°C~50°C
8 Storage Temp:	-20°C~90°C
9 Driver IC:	
10 Backlight:	

CIP PIN TABLE

1	2	3	4	5	6
VDD	RESET	INT	SDA	SCL	GRD

2. PRODUCT DESCRIPTION

General Description

Product type	Projected capacitive Touch Panel
Product structure	Glass lens +Glass sensor
Product Size	10.1" (A, A)
Resolution	1280*800
Operation temperature	0°C~50°C
Storage temperature	-20°C~60°C
Control IC	FT5606
Sensor Channel	TX37,RX23

● Mechanical Description

Item	Standard Value	Unit
TP outline dimension	258.0 (W) *176.6. (H) *1.65 (T)	mm
TP view area	218.0 (W) *136.6 (H)	mm
sensor outline dimension	234.02 (W) * 153.125 (H)	mm
sensor active area	219.0 (W) *137.6 (H))	mm

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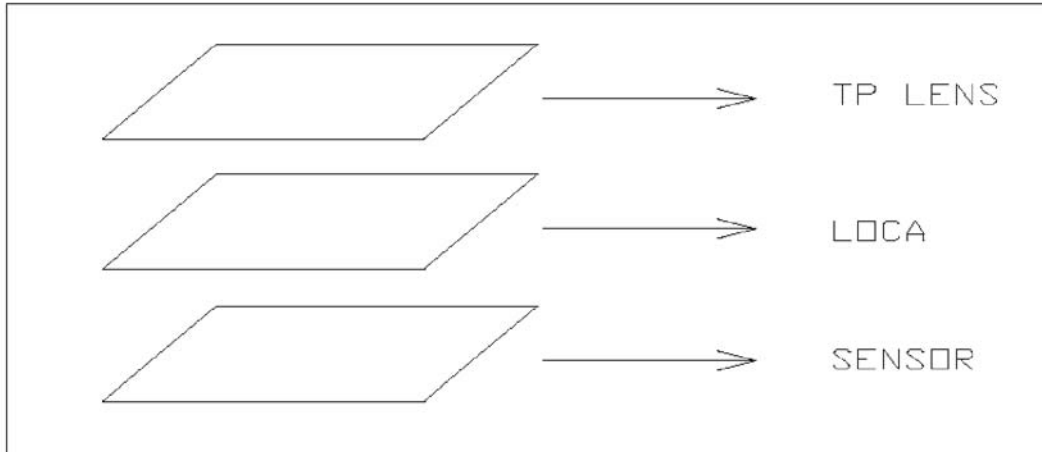
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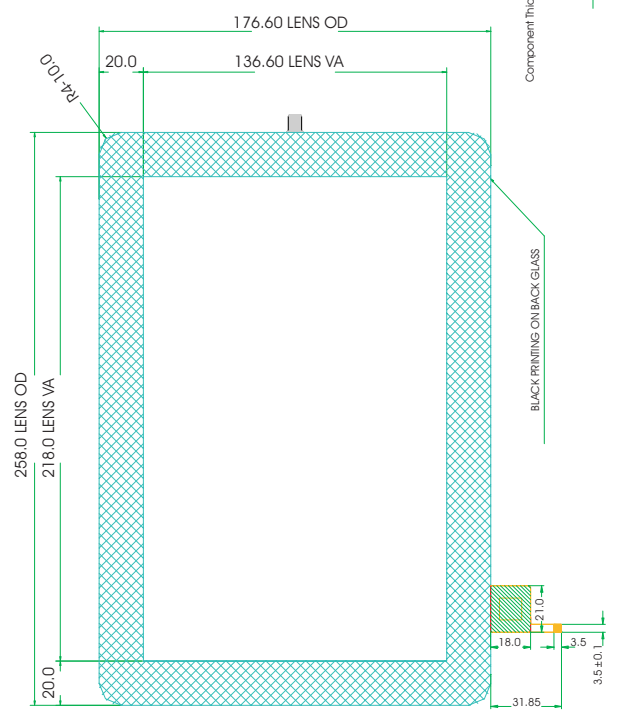
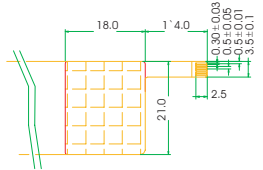
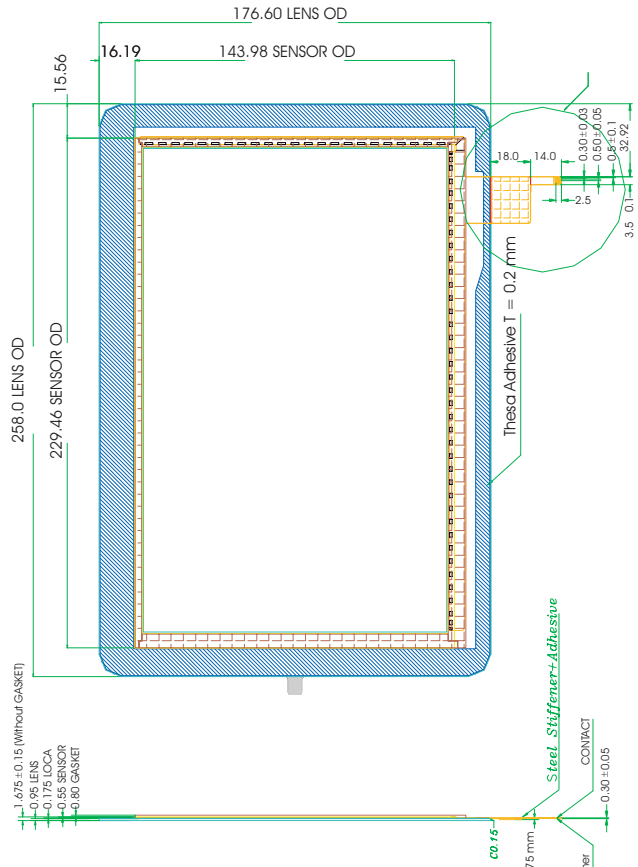
DATE:
11/14/14

● **Structure Description**



● **Communication Interface**

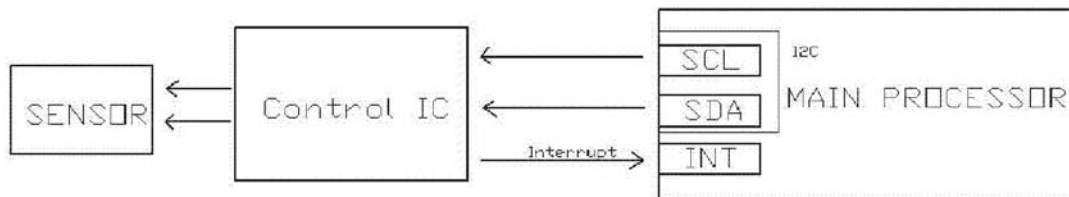
I/O Voltage	3.3V
Multi-touch max points	5Points
INT Mode	Trigger
Communication interface/address	0x70(8 bit)
SCL frequency	100K-400K



CTP PIN TABLE

1	2	3	4	5	6
VID	RESET	INT	SUM	SCL	GRD

4. HARDWARE INTERFACE BLOCK DIAGRAM



5. PRODUCT SPECIFICATIONS

VDDA=2.8~3.3V, Ta=10~60°C

Item	Min	Typ	Max	Unit	Note
Transmittance	86	87		%	
Power Supply voltage	2.8		3.6	V	DC
Power Supply Current(Active Mode)		17.2		mA	
Power Supply Current(monitor Mode)		6.5		mA	
Input high-level voltage	0.8 x VDDA		VDDA	V	
Input low -level voltage	-0.3		0.2 x VDDA	V	
Output high -level voltage	0.8 x VDDA			V	IOH=-0.1mA
Output low -level voltage			0.2 x VDDA	V	IOH=0.1mA

Note: All current measurements are average current.

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6. FPC INTERFACE PIN

● Pin Definitions

NO.	Pin Name	Description
1	VDD	Analog power supply
2	RESET	Reset Signal
3	INT	External interrupt to the host
4	SDA	I2C SDA
5	SCL	I2C SCL
6	GND	Digital ground

7. RELIABILITY TEST

● Mechanical Test

No.	Item	Requirement	Verification method
1	Impact Resistance Test	No crack after test	Use the 64g steel ball is dropped on the glass surface from 55cm height at 12times glass side.
3	Surface hardness	6H	

● Electrical Test

No.	Item	Specification	Remark
1	Function test	No OPEN and no SHORT for all sensors. Linearity is OK	Test Condition: Temperature: 25°C Voltage: 3.3V

● Optical Test

No.	Item	Specification	Remark
1	Transmission	T87%	Total light wavelength

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