TITLE : BP101WX1-210

Product Specification

Rev. A

HEFEI BOE OPTOELECTRONICS TECHNOLOGY

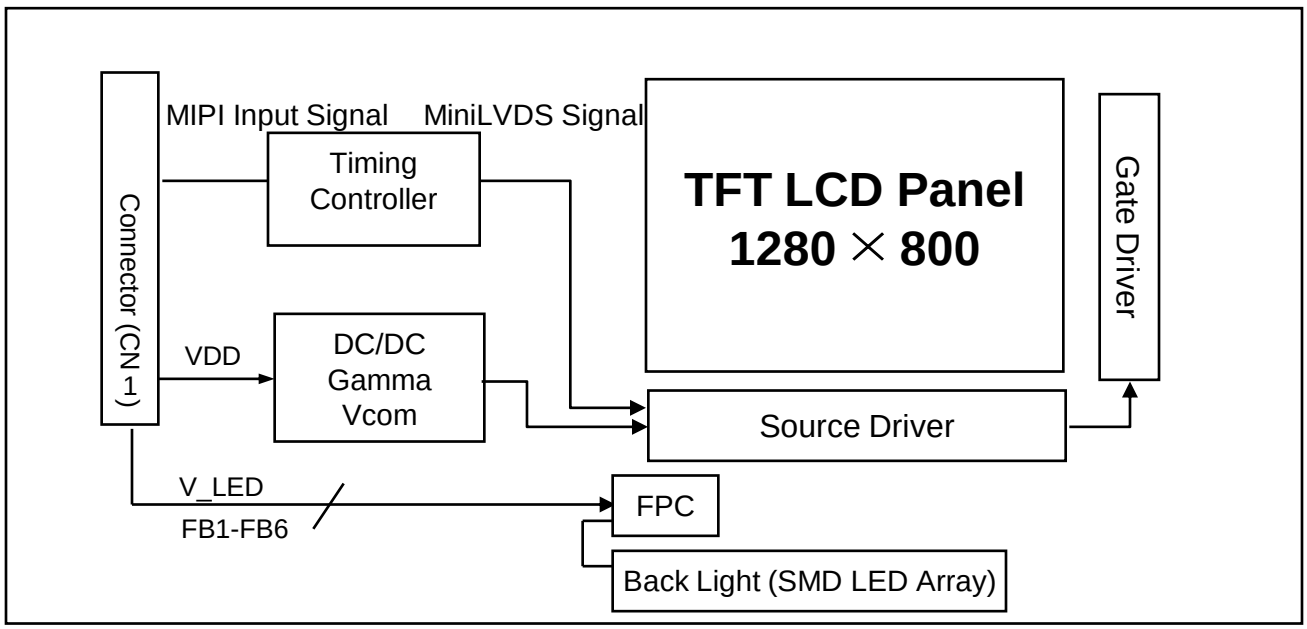
REV.	ECN NO.	DESCRIPTION OF CHANGES	DATE	PREPARED
0	-	Initial Release	2014.2.19	J.C Huang
A	000415	Tcon code change, Module Label change	2014.2.19	J.C Huang

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

BP101WX1-210 is a color active matrix TFT LCD module using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 10.07 inch diagonally measured active area with WXGA resolutions (1280 horizontal by 800 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors. The TFT-LCD panel used for this module is adapted for a low reflection and higher color type.



1.2 Features

- 4 Lane MIPI Interface
- Thin and light weight
- Display 16.7M colors (Hi FRC)
- High luminance and contrast ratio, low reflection and wide viewing angle
- 3.3V for Logic Power
- RoHS Compliant

1.3 Application

- Tablet & Application Mini-PC (Wide Type)

1.4 General Specification

< Table 1. General Specifications >

Parameter	Specification	Unit	Remarks
Active area	216.96(H) ×135.60(V)	mm	
Number of pixels	1280(H) ×800(V)	pixels	
Pixel pitch	169.5	㎛	
Pixel arrangement	Pixels RGB stripe arrangement		
Display colors	16.7M(6bits + Hi-FRC)	colors	
Display mode	Transmission mode. Normally Black		
Outline Dimension	228.3×149.05 ×2.39typ.	mm	
Weight	155(max)	gram	
Surface Treatment	AG, 3H, (Front Polarizer)		
Back-light	Bottom edge side, 1-LED Lighting Bar Type		36* LED Array

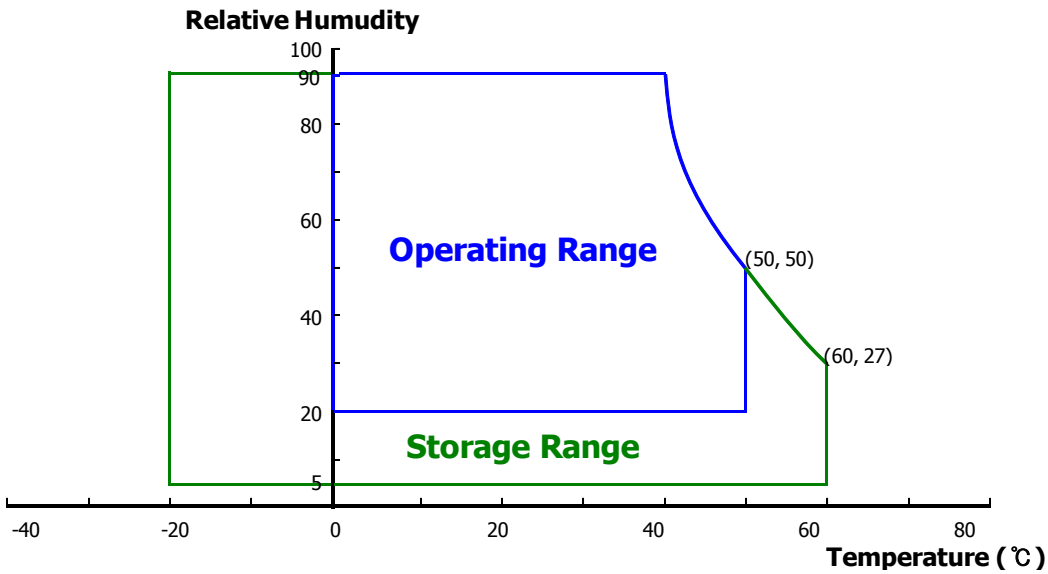
2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2. LCD Module Electrical Specifications > [Ta =25±2 ℃]

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage (LCD Module)	V_{DD}	-0.3	4.2	V	
LED Forward Voltage of every LED string	V_{LED}	-0.3	19.2	V	
LED Forward Current of every LED string	I_{LED}	-	30	mA	
LED string Reverse Voltage	V_R	-	2	V	
Operating Temperature	T_{OP}	0	+50	℃	1)
Storage Temperature	T_{ST}	-20	+60	℃	

Note : 1) Temperature and relative humidity range are shown in the figure below.
Wet bulb temperature should be 39 ℃ max. and no condensation of water.



3.0 ELECTRICAL SPECIFICATIONS

3.1 TFT LCD Module

< Table 3. LCD Module Electrical Specifications > [Ta =25±2 ℃]

Parameter	Symbol	Values			Unit	Notes
		Min	Typ.	Max		
Power Supply Input Voltage	V_{DD}	3.0	3.3	3.6	V	Note 1
Power Supply Current	I_{DD}	-	-	303	mA	
LED Forward Voltage of every LED string	V_{LED}	-	16.8	19.2	V	Note 2
LED Forward Current of every LED string	I_{LED}	-	20	21	mA	
Power Consumption	P_D	-	1.0	1.2	W	white pattern
	P_{BL}	1.8	2.0	2.4	W	w/o Driver
	P_{Total}	-	3.0	3.5	W	

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM.
The current draw and power consumption specified is for 3.3V at 25 ℃
Max value at White Pattern

2. Calculated value for reference (VLED X ILED)

3.2 Back-light Unit

< Table 4. LED Driving guideline specifications > Ta=25+/-2°C

Parameter			Min.	Typ.	Max.	Unit	Remarks
LED Forward Voltage		V_F	-	2.8	3.2	V	-
LED Forward Current		I_F	-	2.0	21	mA	-
LED Power Consumption		P_{LED}	1.8	2	2.4	W	Note 1
LED Life-Time		N/A	15,000	-	-	Hour	IF = 20mA Note 2
LED Forward Voltage of every LED string		V_{LED}	15.6	16.8	19.2	V	
LED Forward Current of every LED string		I_{LED}	19	20	21	mA	
PWM Control Level	PWM High Level	V_{PML}	1.2	-	3.6	V	
	PWM Low Level	V_{PML}	-	-	0.4	V	
PWM Control Frequency		F_{PWM}	5	-	20	KHz	
PWM duty Ratio		Duty	10%	-	100%	%	

Notes : 1. Calculator Value for reference $V_{LED} \times I_{LED} \times 6 = P_{LED}$

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

4.0 OPTICAL SPECIFICATION

4.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. While scanning θand/or Ø, the center of the measuring spot on the Display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement. VDD shall be 3.3+/- 0.3V at 25°C. Optimum viewing angle direction is 6 'clock.

4.2 Optical Specifications

<Table 5. Optical Specifications>

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	70	80	-	Deg.	Note 1
		Θ_9		70	80	-	Deg.	
	Vertical	Θ_{12}		70	80	-	Deg.	
		Θ_6		70	80	-	Deg.	
Color Gamut				-	50	-	%	
Luminance Contrast ratio		CR	Θ = 0°	600	-	-		Note 2
Luminance of White	5 Points	Y_w	Θ = 0°	280	330	-	cd/m^2	Note 3
White Luminance uniformity	5 Points	ΔY5		70	80	-		Note 4
White Chromaticity		W_x	Θ = 0°	Typ. -0.03	0.313	Typ. +0.03		Note 5
		W_y			0.329			
Reproduction of color	Red	R_x	Θ = 0°	Typ. -0.03	0.600	Typ. +0.03		
		R_y			0.340			
	Green	G_x			0.315			
		G_y			0.565			
	Blue	B_x			0.150			
		B_y			0.125			
Response Time (Rising + Falling)		T_{RT}	Ta= 25° C Θ = 0°	-	25	-	ms	Note 6
Gamma Scale				2.0	2.2	2.4		
Cross Talk		CT	Θ = 0°	-	-	2.0	%	Note 7

Notes : 1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 1).

2. Contrast measurements shall be made at viewing angle of Θ= 0 and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state . (see FIGURE 1) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Center Luminance of white is defined as luminance values of 5point average across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display, the LED current is set at 20mA.

4. The White luminance uniformity on LCD surface is then expressed as : ΔY = Minimum Luminance of 5 (13)points / Maximum Luminance of 5(13) (points (see FIGURE 2).

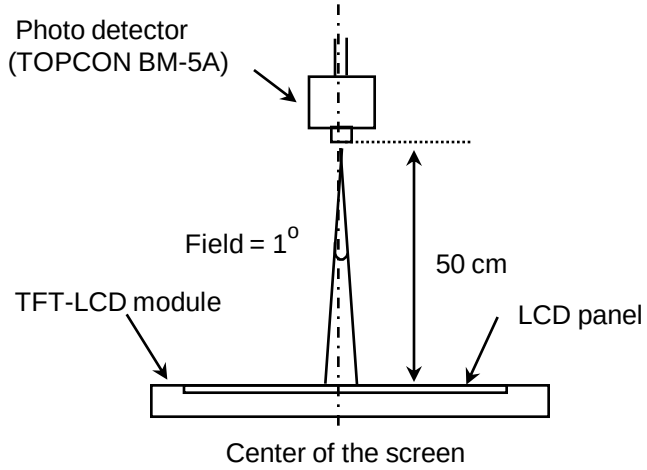
5. The color chromaticity coordinates specified in Table 5 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

6. The electro-optical response time measurements shall be made as FIGURE 3 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.

7. Cross-Talk of one area of the LCD surface by another shall be measured by comparing the luminance (YA) of a 25mm diameter area, with all display pixels set to a gray level, to the luminance (YB) of that same area when any adjacent area is driven dark. (See FIGURE 4).

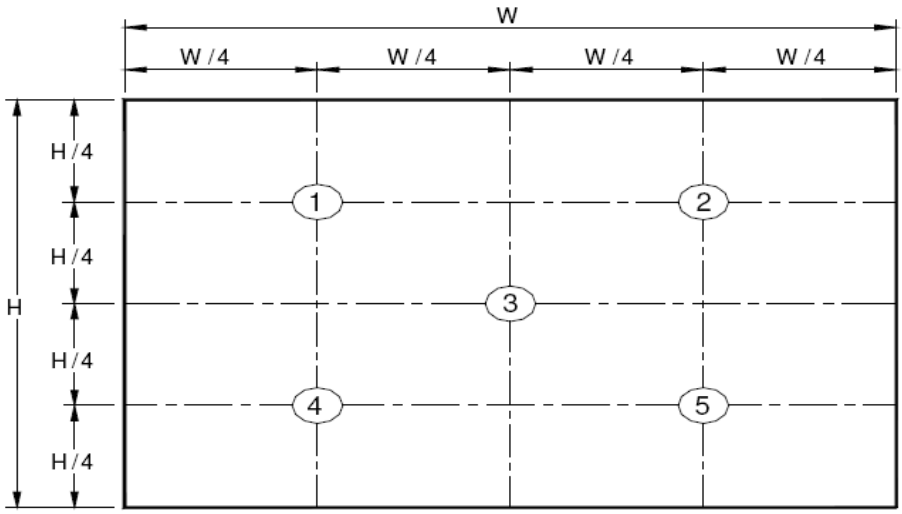
4.3 Optical measurements

Figure 1. Measurement Set Up



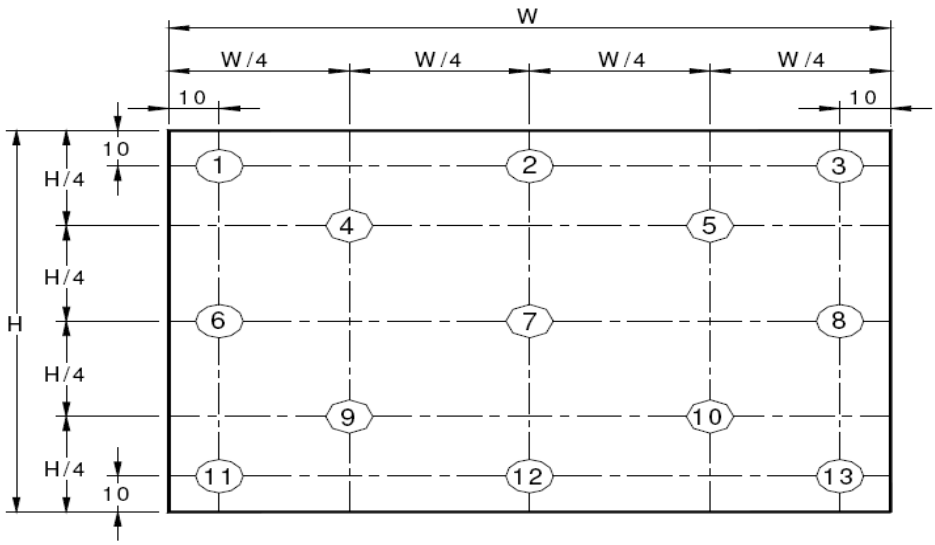
View angel range measurement setup

Figure 2. White Luminance and Uniformity Measurement Locations (5 points)



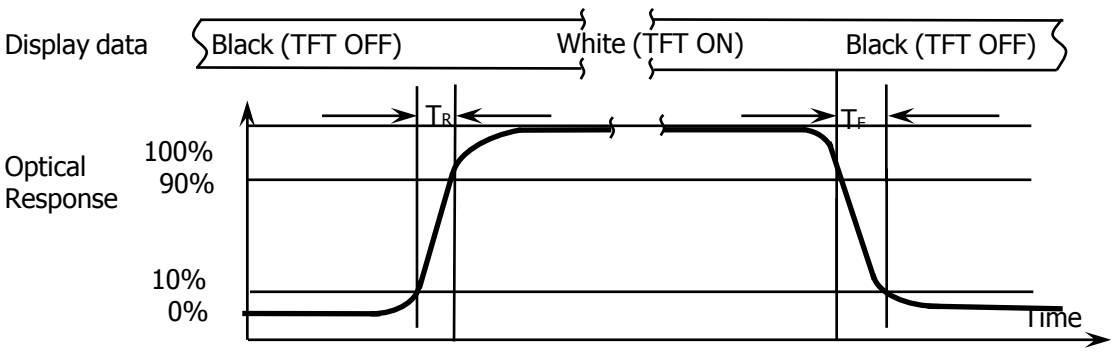
Center Luminance of white is defined as luminance values of center 5 points across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display.
The White luminance uniformity on LCD surface is then expressed as : ΔY5 = Minimum Luminance of 5 points / Maximum Luminance of 5points (see FIGURE 2).

Figure 3. Uniformity Measurement Locations (13 points)



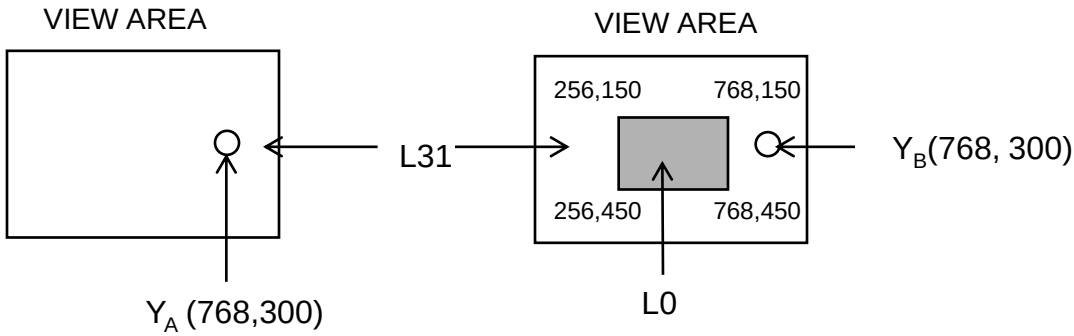
The White luminance uniformity on LCD surface is then expressed as : ΔY13 = Minimum Luminance of 13 points /Maximum Luminance of 13 points (see FIGURE 3).
The White luminance uniformity of 5 point is the same test method as 13 point using FIGURE 2.

Figure 4. Response Time Testing



The electro-optical response time measurements shall be made as shown in FIGURE 4 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr and 90% to 10% is Td.

Figure 5. Cross Modulation Test Description



$$\text{Cross-Talk (\%)} = \left| \frac{Y_B - Y_A}{Y_A} \right| \times 100$$

Where:

Y_A = Initial luminance of measured area (cd/m^2)
Y_B = Subsequent luminance of measured area (cd/m^2)

The location measured will be exactly the same in both patterns.

Cross-Talk of one area of the LCD surface by another shall be measured by comparing the luminance (YA) of a 25mm diameter area, with all display pixels set to a gray level, to the luminance (YB) of that same area when any adjacent area is driven dark (Refer to FIGURE 5).

5.0 INTERFACE CONNECTION.

5.1 Electrical Interface Connection

The electronics interface connector is XF3H-3955-31AR.
The connector interface pin assignments are listed in Table 6.

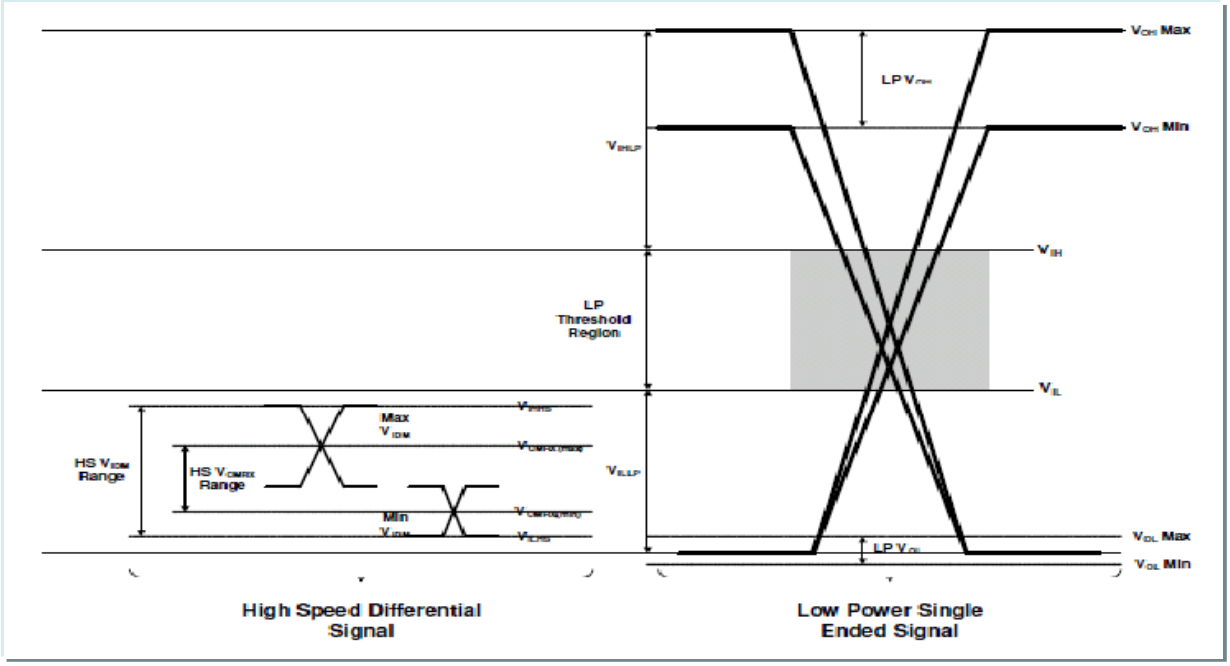
<Table 5. 1. Pin Assignments for the Interface Connector>

Terminal	Symbol	Functions
Pin No.	Symbol	Description
1	VDD	Logic power 3.3V
2	VDD	Logic power 3.3V
3	VDD	Logic power 3.3V
4	IOVCC	IO VCC 1.8V power supply
5	NC	Non Connection
6	NC	Non Connection
7	NC	Non Connection
8	ID	Product ID signal output(1.8V)
9	NC	Non Connection
10	GND	GROUND
11	MIPI_3N	MIPI data negative signal(3N)
12	MIPI_3P	MIPI data positive signal(3P)
13	GND	GROUND
14	MIPI_0N	MIPI data negative signal(0N)
15	MIPI_0P	MIPI data positive signal(0P)
16	GND	GROUND
17	MIPI_CLKN	MIPI CLK negative signal(CLKN)
18	MIPI_CLKP	MIPI CLK positive signal(CLKP)
19	GND	GROUND
20	MIPI_1N	MIPI data negative signal(1N)

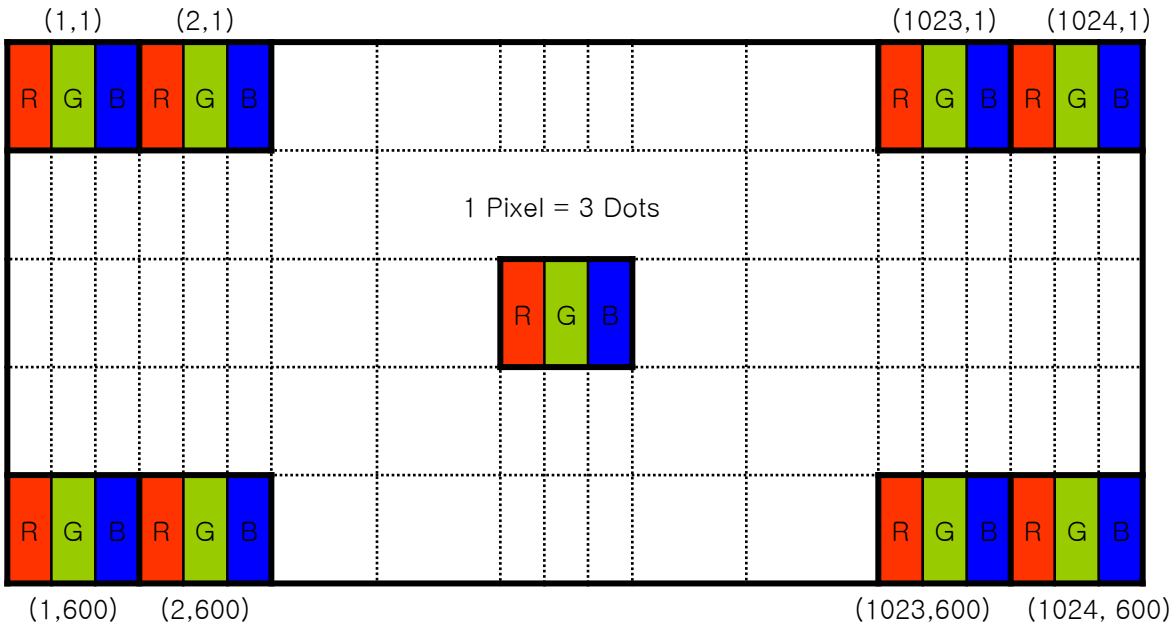
<Table 5.2. Pin Assignments for the Interface Connector>

Terminal	Symbol	Functions
Pin No.	Symbol	Description
21	MIPI_1P	MIPI data positive signal(1P)
22	GND	GROUND
23	MIPI_2N	MIPI data negative signal(2N)
24	MIPI_2P	MIPI data positive signal(2P)
25	GND	GROUND
26	PWMO	timing controller PWM output signal to LED Driver
27	NC	Non Connection
28	NC	Non Connection
29	NC	Non Connection
30	PWMI	PWM signal to timing controller
31	LEDA2	LED Anode (Positive)
32	LEDA1	LED Anode (Positive)
33	LEDK2	LED Cathode (Negative)
34	LEDK1	LED Cathode (Negative)
35	LEDK4	LED Cathode (Negative)
36	LEDK3	LED Cathode (Negative)
37	LEDK6	LED Cathode (Negative)
38	LEDK5	LED Cathode (Negative)
39	GND	GROUND

5.2 MIPI Input signal SPEC.



5.3 Data Input Format

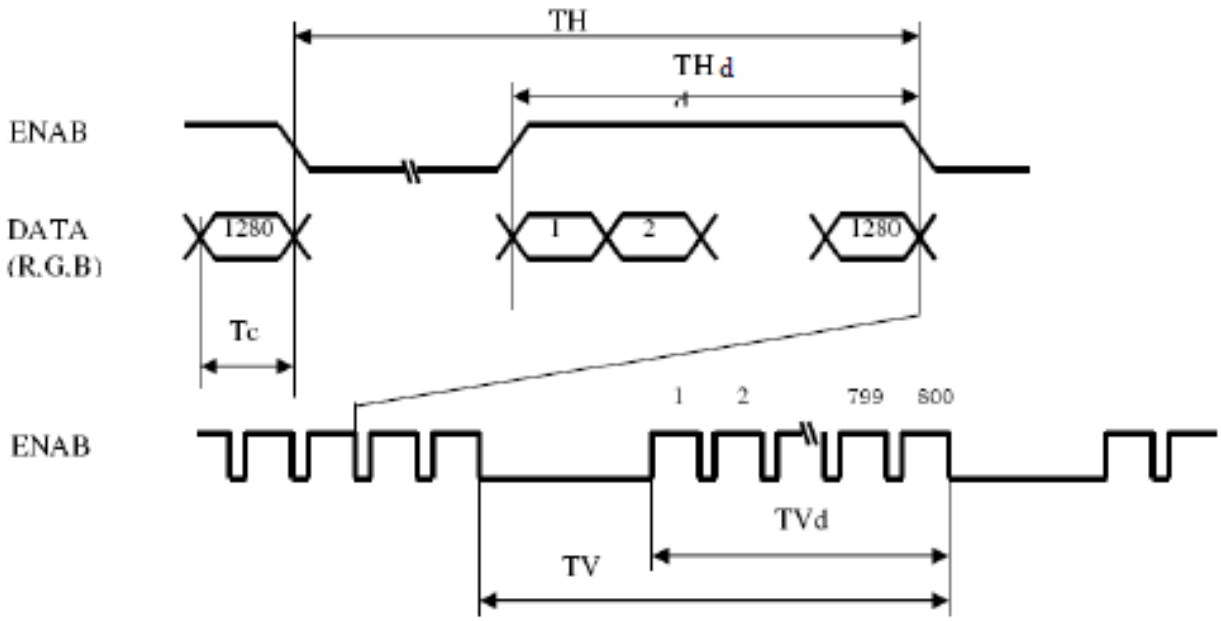


Display Position of Input Data (V-H)

6.0 SIGNAL TIMING SPECIFICATION

6.1 Signal timing

ITEM	Symbol		Min	Typ	Max	Unit	Note
CLK	Period	t_{CLK}	4		4.44	ns	
	Frequency	-		450	500	Mbps	
Hsync	Period	t_{HP}	-	1330	-	t_{CLK}	
	Frequency	f_H	-	48.72	-	KHz	
Vsync	Period	t_{VP}	-	812	-	t_{HP}	
	Frequency	f_V	-	60	-	Hz	
Horizontal Active Display Term	Valid	t_{HV}	-	1280	-	t_{CLK}	
	Total	t_{HP}	-	1330	-	t_{CLK}	
Vertical Active Display Term	Valid	t_{VV}	-	800	-	t_{HP}	
	Total	t_{VP}	-	812	-	t_{HP}	

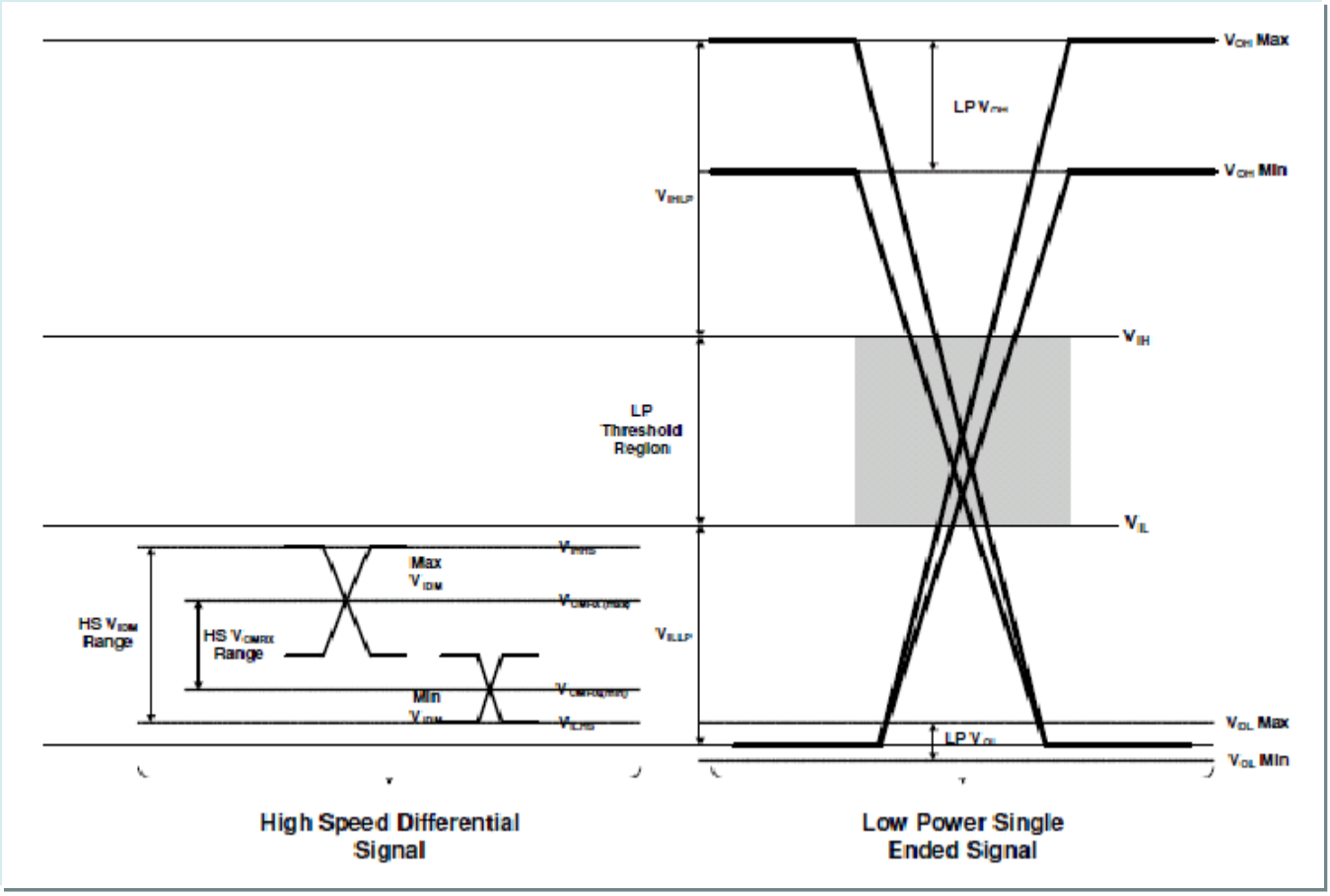


Interface Timing

6.2 MIPI Rx Interface Timing Parameter

The specification of the MIPI Rx interface timing parameter is shown in Table 8.

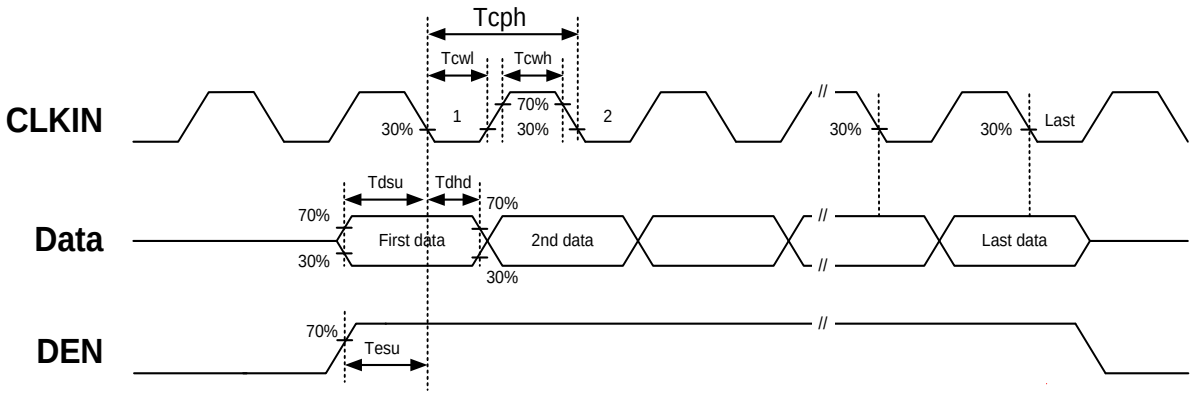
<Table 8. MIPI Rx Interface Timing Specification>



MIPI Receiver Differential Input (DC Characteristics)						
Symbol	Description	Min.	Typ.	Max.	Unit	Condition
BR_{MIPI}	Input data bit rate	200	-	1000	Mbps	
V_{CMRX}	Common-mode voltage(HS Rx mode)	70	-	330	mV	
V_{IDTH}	Differential input high threshold (HS Rx mode)	-	-	70	mV	
V_{IDTL}	Differential input low threshold (HS Rx mode)	-70	-	-	mV	
$\lvert V_{IDM} \rvert$	Differential input voltage range (HS Rx mode)	70	-	500	mV	
V_{IHHS}	Single-end input high voltage (HS Rx mode)	-	-	460	mV	
V_{ILHS}	Single-end input low voltage (HS Rx mode)	-40	-	-	mV	
Z_{ID}	Differential input impedance	80	100	125	ohm	
V_{IHLP}	Logic 1 input voltage (LP Rx mode)	880	-	-	mV	
V_{ILLP}	Logic 0 input voltage (LP Rx mode)	-	-	550	mV	
VOH	Output high level (LP Tx mode)	1.08	1.2	1.32	V	
VOL	Output low level (LP Tx mode)	-50	-	50	mV	

MIPI Receiver Differential Input (DC Characteristics)						
Symbol	Description	Min.	Typ.	Max.	Unit	Condition
T_{MIN-RX}	Minimum pulse width response (LP Rx mode)	50	-	-	ns	
$T_{LP-PULSE-TX}$	Pulse width of the LP exclusive-OR clock	50	55	58	ns	1st clock pulse after STOP state or last clock pulse before STOP state/all other pulse
$T_{RLP\ /\ TFLP}$	15%~85% rise time and fall time (LP Tx mode)	-	-	25	ns	
T_{REOT}	30%~85% rise time and fall time of EOT (LP Tx mode)	-	-	35	ns	
$T_{LP-PER-TX}$	Period of the LP exclusive-OR clock	90	-	-	ns	
T_{SETUP}	Data to clock setup time	0.15	-	-	UI	
T_{HOLD}	Data to clock hold time	0.15	-	-	UI	

7.0 SIGNAL TIMING WAVEFORMS OF INTERFACE SIGNAL



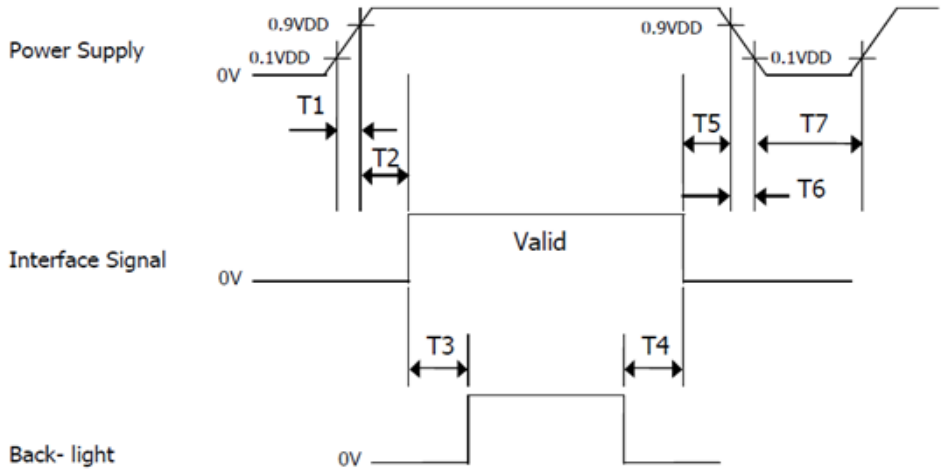
8.0 INPUT SIGNALS, BASIC DISPLAY COLORS & GRAY SCALE OF COLORS

Color & Gray Scale		Input Data Signal																							
		Red Data								Green Data								Blue 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
Basic Colors	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
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	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
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	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
Gray Scale of Red	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
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	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	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	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
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	▽	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	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	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
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of White	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
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	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

9.0 POWER SEQUENCE

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below

Power-On/Off Timing Sequence:



Parameter	Values			Units
	Min	Typ	Max	
T1	0	-	10	ms
T2	0	-	50	ms
T3	200	-	-	ms
T4	200	-	-	ms
T5	0.5	-	50	ms
T6	0	-	10	ms
T7	500	-	-	ms

Notes:

1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

10.0 Connector Description

Physical interface is described as for the connector on LCM.
These connectors are capable of accommodating the following signals and will be following components.

10.1 TFT LCD Module

Connector Name /Description	For Signal Connector
Manufacturer	ORMON or Compatible
Type/ Part Number	XF3H-3955-31AR or Compatible

10.2 LED Connector

Pin No.	Symbol	For Signal Connector
1	FB1	LED Cathode Power Supply
2	FB2	LED Cathode Power Supply
3	FB3	LED Cathode Power Supply
4	FB4	LED Cathode Power Supply
5	FB5	LED Cathode Power Supply
6	FB6	LED Cathode Power Supply
7	NC	No Connection
8	VLED	LED Anode Power Supply
9	VLED	LED Anode Power Supply

11.0 MECHANICAL CHARACTERISTICS

11.1 Dimensional Requirements

FIGURE 5 shows mechanical outlines for the model BP101WX1-210.
Other parameters are shown in Table 9.

<Table 9. Dimensional Parameters>

Parameter	Specification	Unit
Active Area	216.96 (H) ×135.6 (V)	
Number of pixels	1280(H) X800 (V) (1 pixel = R + G + B dots)	
Pixel pitch	0.1695	
Pixel arrangement	RGB Vertical stripe	
Display colors	16.7M	
Display mode	Normally Black	
Dimensional outline	228.3*149.05*2.39(Typ.)	mm
Weight	155 (Max)	gram
Back-light	LED, Horizontal-LED Array type	

11.2 Mounting

See FIGURE 6.

11.3 Glare and Polarizer Hardness.

The surface of the LCD has an low reflection coating and hard coating to reduce scratching.

11.4 Light Leakage

There shall not be obvious visible light from the back-lighting system around the edges of the screen as seen from a distance 50cm from the screen with an overhead light level of 150lux.

12.0 RELIABILITY TEST

The Reliability test items and its conditions are shown in below.

<Table 10. Reliability test>

No		Conditions
1	High temperature storage test	Ta = 60 ℃, 240 hrs
2	Low temperature storage test	Ta = -20 ℃, 240 hrs
3	High temperature & high humidity operation test	Ta = 50 ℃, 90%RH, 240 hrs
4	High temperature operation test	Ta = 50 ℃, 240 hrs
5	Low temperature operation test	Ta = 0 ℃, 240 hrs
6	Thermal shock	Ta = -20 ℃ ↔ 60 ℃ (0.5 hr), 100 cycle
7	Power on/off	2s on/2s off 20000cycles
8	Vibration test (non-operating)	1.5G, 10~500Hz Sign X,Y,Z / Sweep rate : 0.5hour
9	Shock test (non-operating)	220G, Half Sine Wave 2msec ±X,±Y,±Z Once for each direction
10	Electro-static discharge test (non-operating)	Air : 150 pF, 330Ω, 15 KV Contact : 150 pF, 330Ω, 8 KV

13.0 HANDLING & CAUTIONS

(1) Cautions when taking out the module

- Pick the pouch only, when taking out module from a shipping package.

(2) Cautions for handling the module

- As the electrostatic discharges may break the LCD module, handle the LCD module with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
- As the LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD module should be avoided.
- As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
- Do not pull the interface connector in or out while the LCD module is operating.
- Put the module display side down on a flat horizontal plane.
- Handle connectors and cables with care.

(3) Cautions for the operation

- When the module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged.
- Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.

(4) Cautions for the atmosphere
- Dew drop atmosphere should be avoided.
- Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

(5) Cautions for the module characteristics
- Do not apply fixed pattern data signal to the LCD module at product aging.
- Applying fixed pattern for a long time may cause image sticking.

(6) Other cautions
- Do not disassemble and/or re-assemble LCD module.
- Do not re-adjust variable resistor or switch etc.
- When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.

14.0 LABEL

(1) Product label

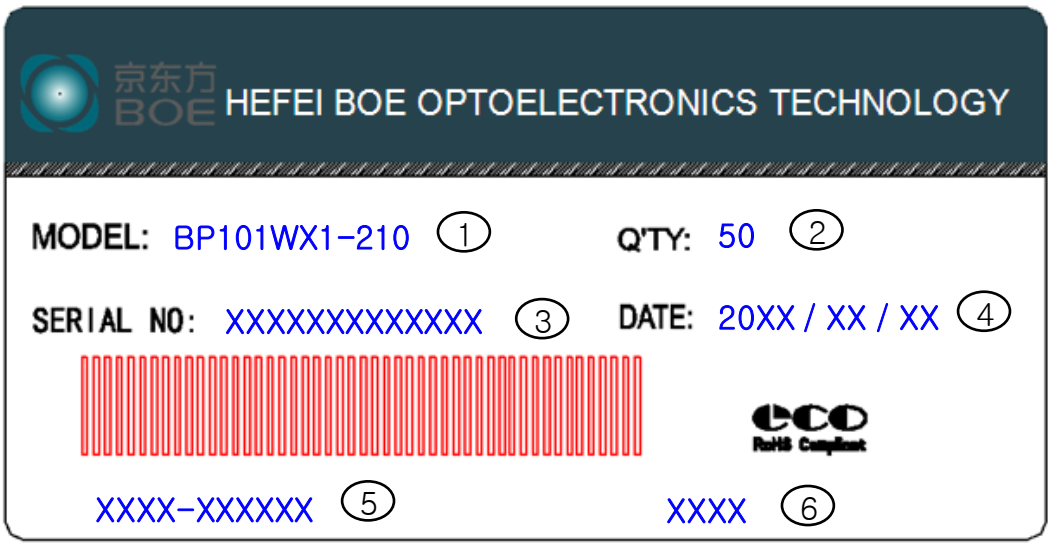
序列号	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
代码	4	F	P	3	1	2	7	3	8	5	0	0	0	1	E	E	J
描述	GBN代码		等级	B3	年份		月	FG Code后四位				序列号					

Code	Description
L	LCM
H	HYDIS
A	BOEOT
B	BOEOT
C	BOEOT
3	BOEHF

Code	Description
1	1月
2	2月
…	…
X	10月
Y	11月
Z	12月

(2) Box label

Label Size: 110 mm (L) × 56 mm (W)
Contents
Model: BP101WX1-210
Q`ty: Module Q`ty in one box
Serial No.: Box Serial No. See next figure for detail description.
Date: Packing Date
Internal use of Product



1. **FG-CODE**
2. **Box 产品数量**
3. **Box ID, 编码规则如下**
4. **Box Packing 日期**
5. **产品物料号(客户端)**
6. **FG-CODE 后四位**

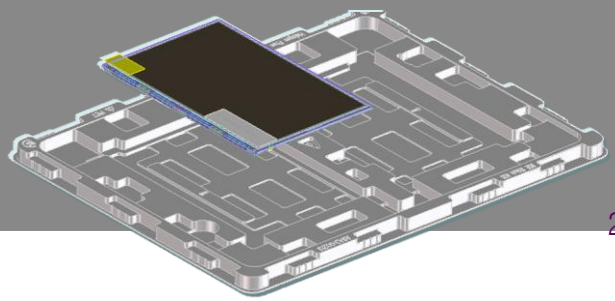
序列号	1	2	3	4	5	6	7	8	9	10	11	12	13
代码	4	J	P	3	1	2	7	0	0	0	1	H	D
描述	GBN代码		等级	B3	年份		月	Rev	序列号				

15.0 PACKING INFORMATION

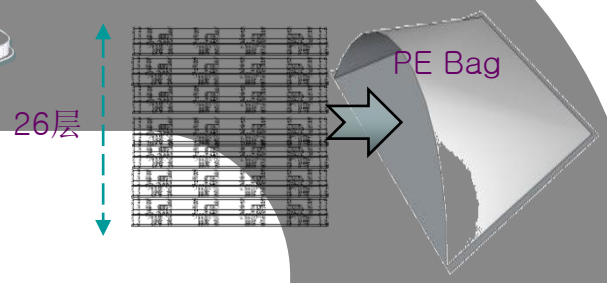
15.1 Packing order

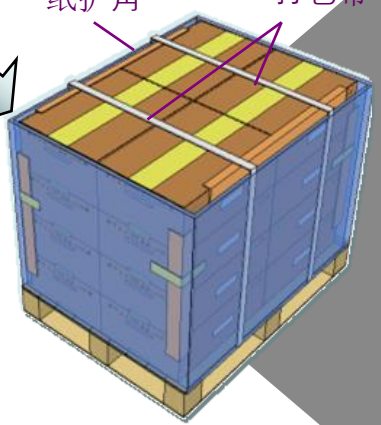
-. 将 2pcs MDL 平放入Tray, Panel 面向上放置EPE

-. 容量: 2pcs/Tray



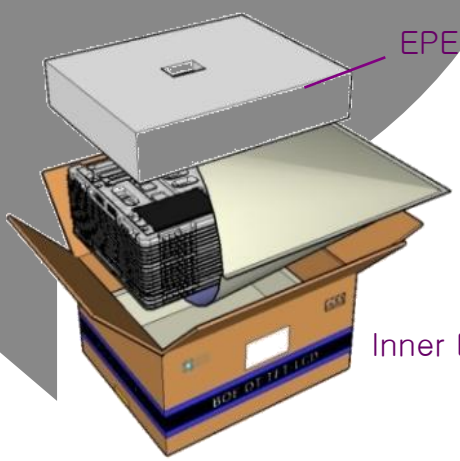
-. 将26pcs PET Tray 平放入PE Bag





-.将PET Tray堆码后平放入Inner Box

-. 容量：50pcs/Inner Box



-. 每个Pallet上放3层Box,
1层6箱,共计18ea Box

-. Pallet 以缠绕膜包裹

-. 容量: 900pcs/Pallet

15.2 Notes

- Box Dimension: 500mm(W) x 400mm(D) x 290mm(H)
- Package Quantity in one Box: 50pcs
- Total Weight: 14kg

16.0 MECHANICAL OUTLINE DIMENSION

Figure 6. TFT-LCD Module Outline Dimension (Front View)

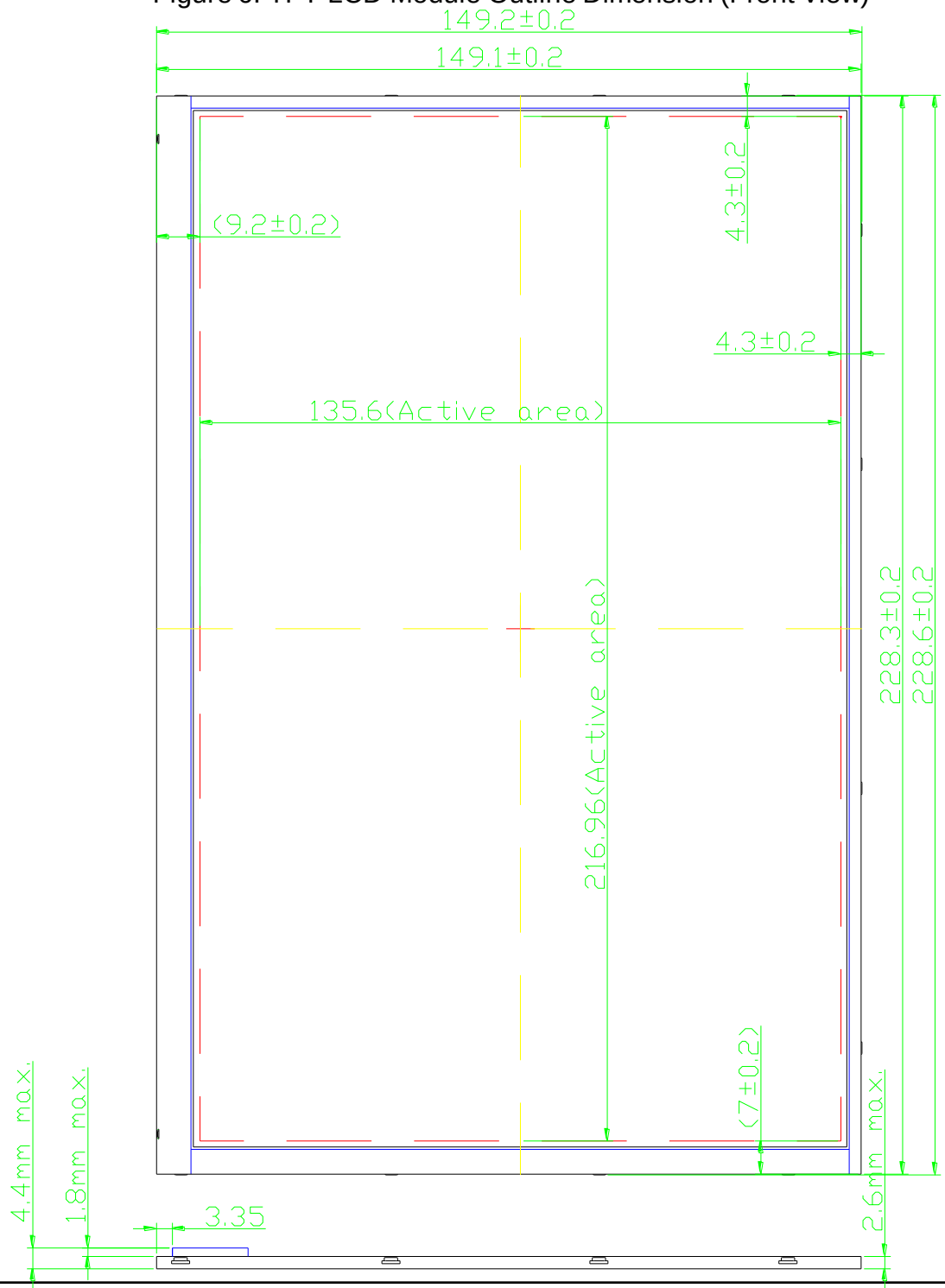
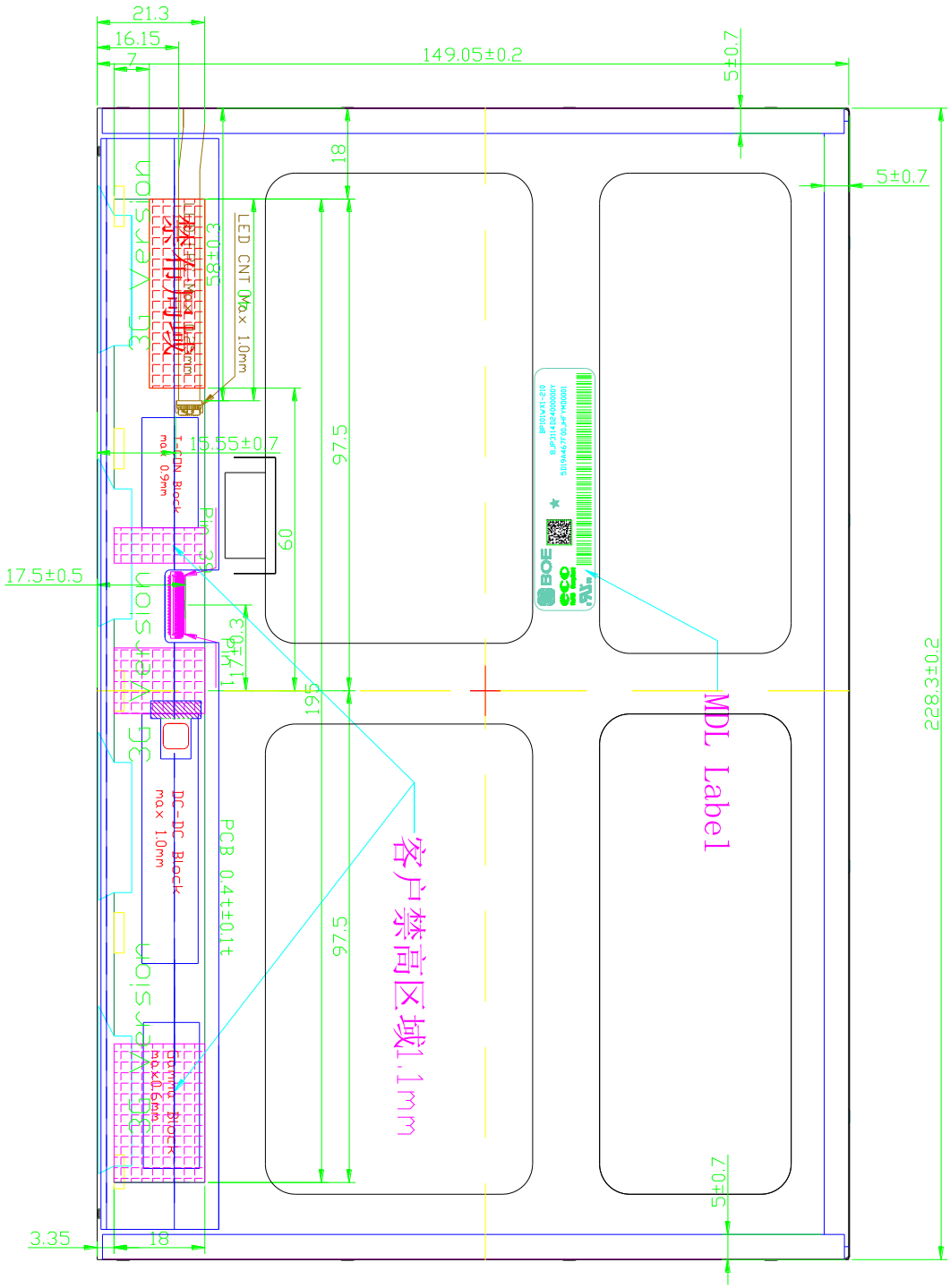


Figure 7. TFT-LCD Module Outline Dimensions (Rear view)



17.0 Flatness & thickness

Flatness： MAX 0.7mm

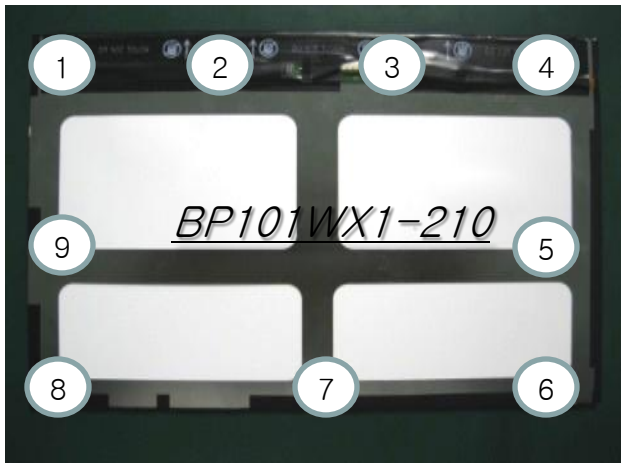


Fig 1. Measuring point

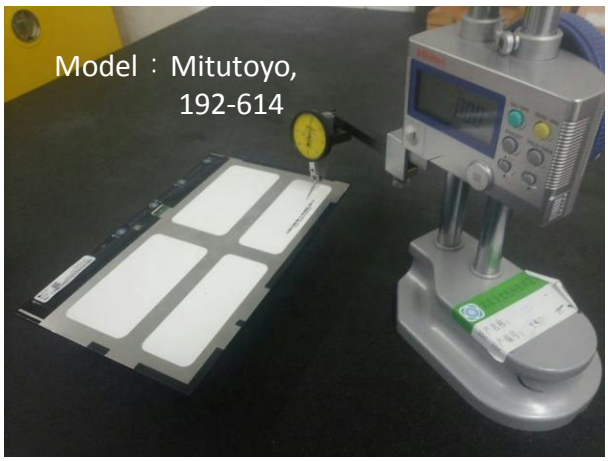


Fig 2. Hight Gauge

Fig 3. Pointer pressure

Measurement methods :

1. Device
Marble platform ; Height Gauge; Dial Gauge ; weight(150g)

2.Method

1. Installed the Dial Gauge on Height Gauge
In accordance with the Horizontal and vertical setting
2. Zero adjustment for Height Gauge
---Marble platform chassis as the base, then Plus pressure 0g, Pointer the next frame comparison '0 '.IF poniter touch the ground, adjusted to "0 Setting.
--- Adjustment cycle: every measurement
3. Weight height measurement : Measured with Micrometer According to this test-point as shown in the Fig1
--- Adjustment cycle : every PLI
4. Place the product on the platform as shown in the Fig2
--- Place the measuring point weights for reading Height Gauge
--- Measuring the weight center height on test point
--- Record the measured values when Dial Gauge pointer to '0' , then subtracted weight height value .

5. Repeat the test 4

Remark :
Place weights on the platform because the back of the LCM is not perfectly flat (because of : PCB and frame).
Use weights on a specific location 9 point as shown as Fig 2 .
LCM will be placed completely horizontal position.

Flatness=Max.-Min. 以下是 **35pcs 平坦度测试 Raw Data**

Item ID	Thickness 1	Thickness 2	Thickness 3	Thickness 4	Thickness 5	Thickness 6	Thickness 7	Thickness 8	Thickness 9	Flatness
011E	2.83	2.8	2.79	2.89	2.85	3.07	2.81	2.89	2.7	0.37
011B	2.82	2.77	2.8	2.86	2.73	2.8	2.72	2.76	2.76	0.14
119	2.81	2.78	2.84	2.89	2.88	2.94	2.65	2.65	2.5	0.44
011C	2.61	2.52	2.64	2.83	2.8	2.92	2.55	2.66	2.52	0.4
011A	2.67	2.69	2.66	2.82	2.78	2.88	2.5	2.6	2.55	0.38
011D	2.82	2.74	2.73	2.88	2.76	2.87	2.62	2.75	2.7	0.26
011L	2.81	2.79	2.73	2.87	2.81	2.84	2.6	2.8	2.75	0.27
011J	2.56	2.73	2.79	2.87	2.88	2.8	2.5	2.7	2.56	0.38
011H	2.85	2.68	2.78	2.89	2.82	2.85	2.51	2.8	2.78	0.38
011K	2.78	2.8	2.87	2.85	2.85	2.99	2.66	2.97	2.76	0.33
011M	2.86	2.82	2.79	2.83	2.78	2.8	2.7	2.89	2.88	0.19
011P	2.85	2.88	2.89	2.99	2.9	2.92	2.46	2.7	2.65	0.53
011Q	2.7	2.85	2.86	2.98	2.89	2.9	2.69	2.74	2.73	0.29
011S	2.89	2.84	3.04	3.16	2.99	3.05	2.61	2.86	2.6	0.56
011R	2.55	2.4	2.62	2.93	2.83	2.91	2.45	2.54	2.37	0.56
011T	2.69	2.72	2.88	3.15	3	2.84	2.76	2.98	2.68	0.47
011U	2.57	2.55	2.54	2.85	2.68	2.91	2.48	2.6	2.48	0.43
011V	2.68	2.69	2.8	2.96	2.93	2.97	2.75	2.85	2.8	0.29
011X	2.62	2.51	2.62	2.85	2.79	2.93	2.41	2.52	2.49	0.52
011Y	2.68	2.67	2.75	3.01	2.91	2.91	2.66	2.91	2.74	0.35
004U	2.85	2.67	2.62	2.94	2.99	2.78	2.39	2.75	2.92	0.6
006T	2.79	2.8	2.93	2.97	2.8	2.79	2.68	2.82	2.79	0.29
4081	2.64	2.55	2.61	2.9	2.82	2.81	2.59	2.64	2.75	0.35
C4FG	2.52	2.57	2.54	2.62	2.81	2.6	2.49	2.61	2.51	0.32
A9HD	2.56	2.34	2.5	2.74	2.96	2.92	2.93	2.75	2.6	0.62
C4FH	2.69	2.4	2.52	2.83	2.95	2.9	2.81	2.66	2.64	0.55
B5GB	2.68	2.17	2.62	2.72	2.76	2.56	2.35	2.65	2.58	0.59
B5JB	2.73	2.55	2.57	2.72	2.56	2.53	2.53	2.82	2.66	0.29
0NKF	2.77	2.82	2.92	2.92	2.85	2.66	2.5	2.67	2.79	0.42
004E	2.89	2.65	2.6	2.94	2.8	2.86	2.57	2.83	2.75	0.37
007C	2.73	2.54	2.61	2.95	2.91	2.98	2.36	2.99	2.76	0.63
006Z	2.66	2.54	2.7	2.87	2.79	2.83	2.24	2.9	2.65	0.66
007A	2.78	2.61	2.72	3.02	2.86	2.82	2.42	2.76	2.69	0.6
007B	2.85	2.62	2.64	2.92	2.81	2.66	2.51	2.97	2.95	0.46
006Q	2.95	2.76	2.68	2.99	2.93	2.89	2.4	2.86	2.82	0.59
0NKG	2.78	2.74	2.91	2.9	2.7	2.6	2.62	3.02	2.93	0.42
Min	2.52	2.17	2.5	2.62	2.56	2.53	2.24	2.52	2.37	0.14
Ave	2.737	2.654	2.725	2.898	2.838	2.841	2.569	2.774	2.689	0.425
Max	2.95	2.88	3.04	3.16	3	3.07	2.93	3.02	2.95	0.66

Thickness：2.39+/-0.2mm

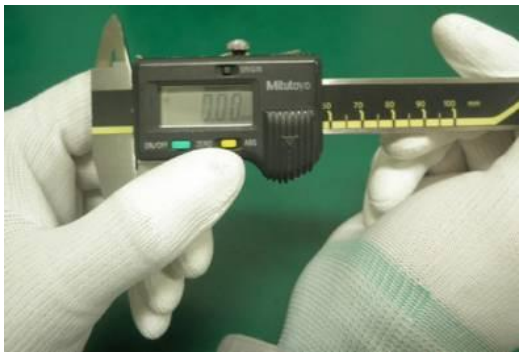


Fig 3. Measuring Equipment

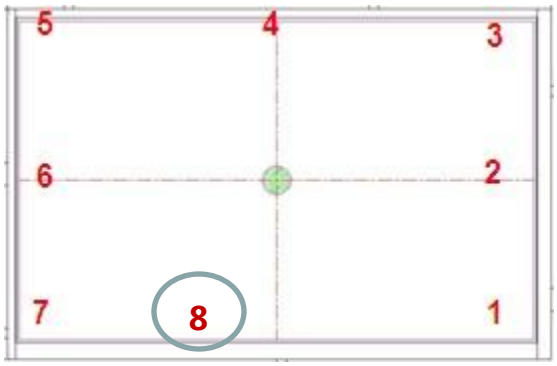


Fig 4. Measuring point

1. Device

Calipers shown as Fig3

2.Method

Measured with Calipers According to this test-point as shown in the Fig4. Point 8 is the thickest location with PCB and the Maximum is 4.4mm .

LCD Thickness：2.39+/-0.2mm