TITLE : BP101WX7-100-3940

Product Specification

Rev. P0

HEFEI BOE OPTOELECTRONICS TECHNOLOGY

RoHS FREE
HFR | PVC | Pht | Be | Sb

REVISION HISTORY

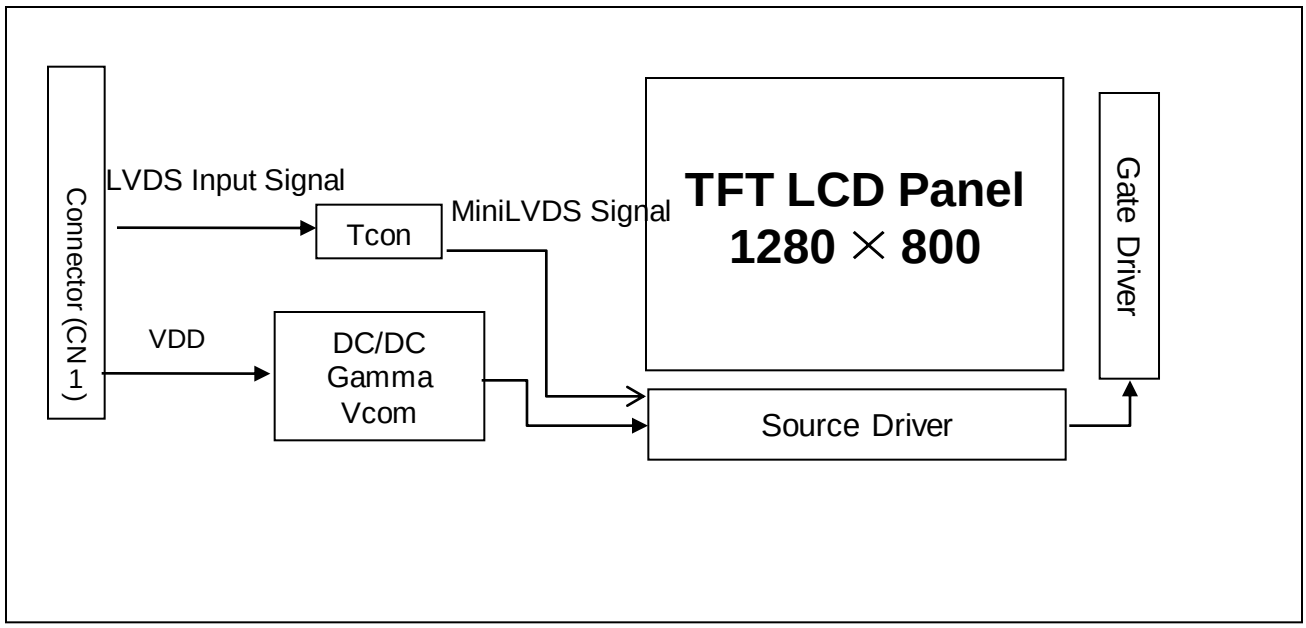
REV.	ECN NO.	DESCRIPTION OF CHANGES	DATE	PREPARED
P0	-	Initial Release	2014.01.05	Xia Long

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

10.1WXGA 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 10.1 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 16777216 colors. The TFT-LCD panel used for this FOB is adapted for a low reflection and higher color type.



1.2 Features

- 1 Channel LVDS Interface with 1 pixel / clock
- Thin and light weight
- Display 16777216 colors
- High luminance and contrast ratio, low reflection and wide viewing angle
- DE (Data Enable) signal mode
- 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) x 139.6(V)	mm	
Number of pixels	1280(H) ×800(V)	pixels	
Pixel pitch	0.1695 (H) X0.1695 (V)×RGB	mm	
Pixel arrangement	Pixels RGB stripe arrangement		
Display colors	16777216(8bits)	colors	
Display mode	Transmission mode, Normally Black		
Outline Dimension	224.81(H)*144.25(V)*0.5（D）typ.	mm	
Weight	70 (max)	gram	
Surface Treatment	Hard Coating, 3H, (Front Polarizer)		

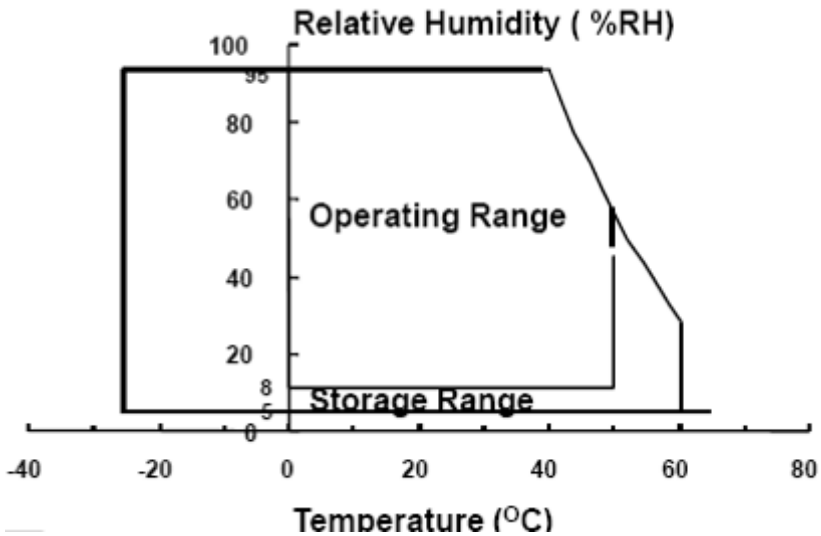
2.0 ABSOLUTE MAXIMUM RATINGS

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.	Typ.	Max.	Unit	Remarks
Power Supply Voltage (LCD Module)	V_{DD}	3	3.3	3.6	V	
Operating Temperature	T_{OP}	-20		+65	℃	
Storage Temperature	T_{ST}	-40		+85	℃	

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 Electrical Specifications

< 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	-
Power Supply Current	I_{DD}	-	-	260	mA	
Positive-going Input Threshold Voltage	V_{IT+}	-	-	+100	mV	Vcom = 1.2V typ.
Negative-going Input Threshold Voltage	V_{IT-}	-100	-	-	mV	
Differential input common mode voltage	V_{com}	-	1.2	-	V	V_{IH}=100mV, V_{IL}=-100mV
Power Consumption	P_D	-	-	0.85	W	Note 1

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℃.
b) Typ. : Color Bar Pattern
a) Max. : White(L255) Pattern

4.0 OPTICAL SPECIFICATION

4.1 Overview

The test of view angle range 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-5A) 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°. We refer to θØ=0 (=θ3) as the 3 o'clock direction (the "right"), θØ=90 (= θ12) as the 12 o'clock direction ("upward"), θØ=180 (= θ9) as the 9 o'clock direction ("left") and θØ=270(= θ6) as the 6 o'clock direction ("bottom"). While scanning θand/or Ø, the center of the measuring spot on the Display surface shall stay fixed. The luminance, color and uniformity should be tested by CA210. The backlight should be operating for 30 minutes prior to measurement. VDD shall be 3.3 ± 0.5V at 25°C. Optimum viewing angle direction is 6 'clock.

4.2 Optical Specifications

<Table 4. Optical Specifications>

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	80	80	-	Deg.	Note 1
		Θ_9		80	80	-	Deg.	
	Vertical	Θ_{12}		80	80	-	Deg.	
		Θ_6		80	80	-	Deg.	
Color Gamut				-	50	-	%	
Luminance Contrast ratio		CR	Θ = 0°	700	900			Note 2
Reproduction of color	White	Wx	Θ = 0°	Typ. -0.03	0.304	Typ. +0.03		
		Wy			0.333			
	Red	R_x			0.600			
		R_y			0.325			
	Green	G_x			0.282			
		G_y			0.536			
	Blue	B_x			0.143			
		B_y			0.151			
Response Time (Rising + Falling)		T_{RT}	Ta= 25° C Θ = 0°	-	30	-	ms	Note 3
Cross Talk		CT	Θ = 0°	-	-	2.0	%	Note 4

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.

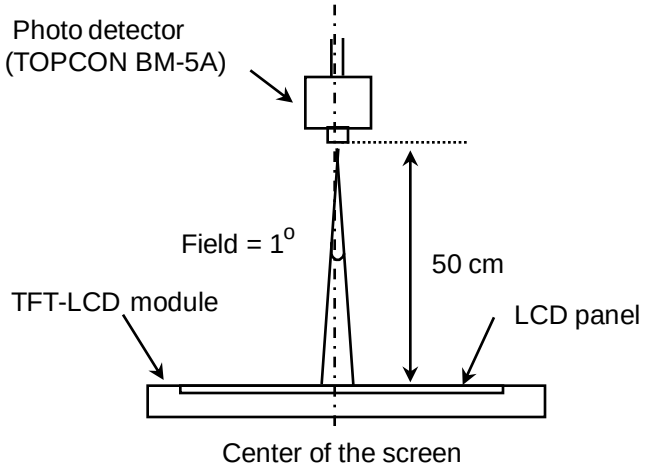
$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

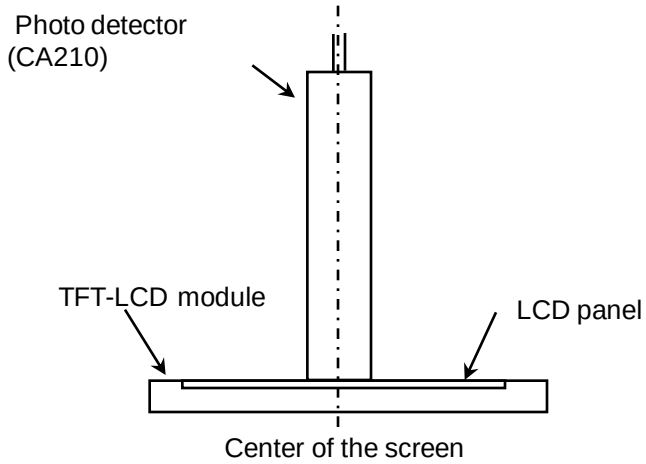
3. The electro-optical response time measurements shall be made as FIGURE 3 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.

4. 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

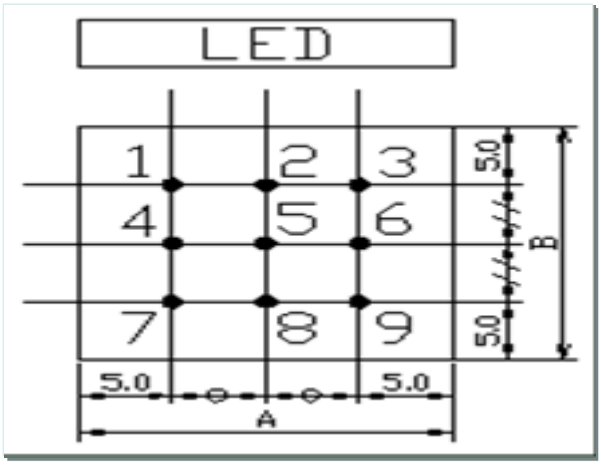
Figure 1. Measurement Set Up





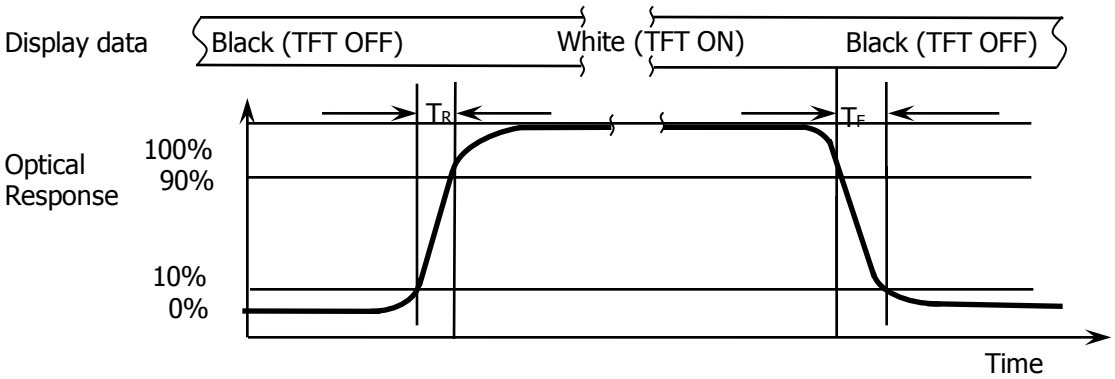
View angel range measurement setup Luminance , uniformity and color measurement setup

Figure 2. White Luminance and Uniformity Measurement Locations (9points)



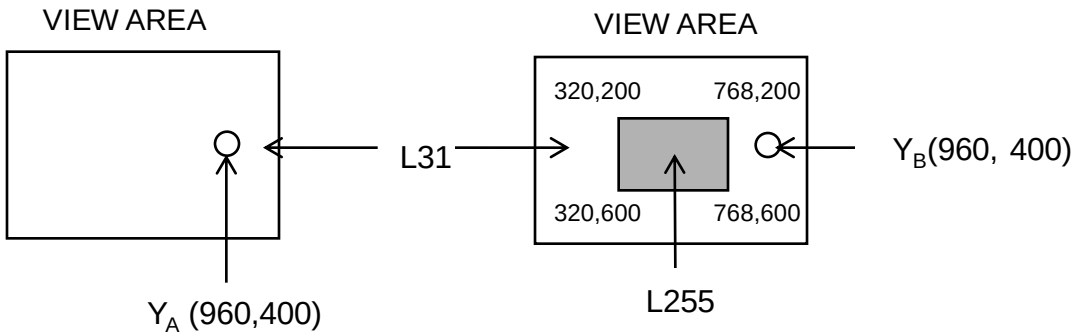
Center Luminance of white is defined as luminance values of center 9points across the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 2 for a total of the measurements per display.
The White luminance uniformity on LCD surface is then expressed as : ΔY9 = Minimum Luminance of 9 points / Maximum Luminance of 9points (see FIGURE 2).

Figure 3. Response Time Testing



The electro-optical response time measurements shall be made as shown in 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.

Figure 4. 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 4).

5.0 INTERFACE CONNECTION.

5.1 Electrical Interface Connection

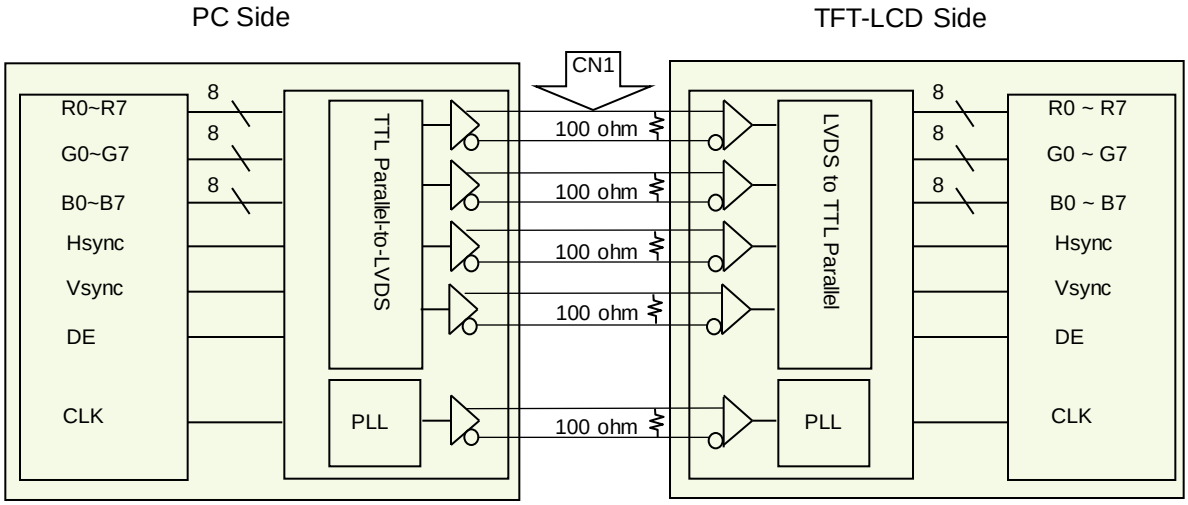
The electronics interface connector is PF030-B45B-N09

The connector interface pin assignments are listed in Table 5.

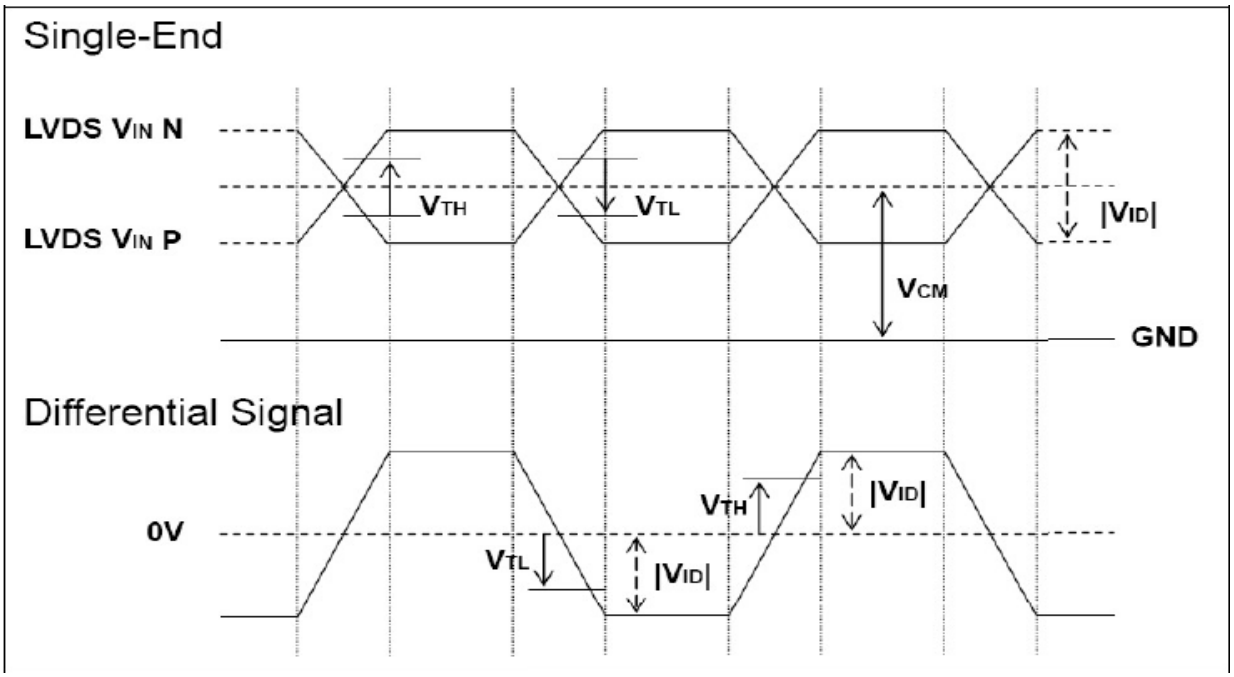
<Table 5. Pin Assignments for the Interface Connector>

Pin	Symbol	Functions	Pin	Symbol	Functions
1	GND1	Ground	24	RXin1N	-LVDS differential data (G1-G5, B0-B1)
2	ID_CHK	ID_CHK	25	RXin1P	+LVDS differential data (G1-G5, B0-B1)
3	NC1	No connection	26	GND8	Ground
4	3.3V	Logic power 3.3V	27	RXin0N	-LVDS differential data (R0-R5, G0)
5	3.3V	Logic power 3.3V	28	RXin0P	+LVDS differential data (R0-R5, G0)
6	3.3V	Logic power 3.3V	29	GND9	Ground
7	3.3V	Logic power 3.3V	30	GND10	Ground
8	3.3V	Logic power 3.3V	31	NC2	No connection
9	WPN	No connection	32	FB1	LED FB1
10	SCL	No connection	33	FB2	LED FB2
11	SDA	No connection	34	FB3	LED FB3
12	GND2	Ground	35	FB4	LED FB4
13	GND3	Ground	36	FB5	No connection
14	GND4	Ground	37	FB6	No connection
15	RXin3N	-LVDS differential data (R6,R7,G6,G6,B6,B7)	38	NC3	No connection
16	RXin3P	+LVDS differential data (R6,R7,G6,G6,B6,B7)	39	VLED1	LED Power supply Voltage
17	GND5	Ground	40	VLED2	LED Power supply Voltage
18	LVDS_RX_N	- LVDS differential clock input	41	VLED3	LED Power supply Voltage
19	LVDS_RX_P	+ LVDS differential clock input	42	VLED4	LED Power supply Voltage
20	GND6	Ground	43	VLED5	LED Power supply Voltage
21	RXin2N	-LVDS differential data (B2-B5, HS, VS, DE)	44	NC4	No connection
22	RXin2P	+LVDS differential data (B2-B5, HS, VS, DE)	45	GND11	Ground
23	GND7	Ground			

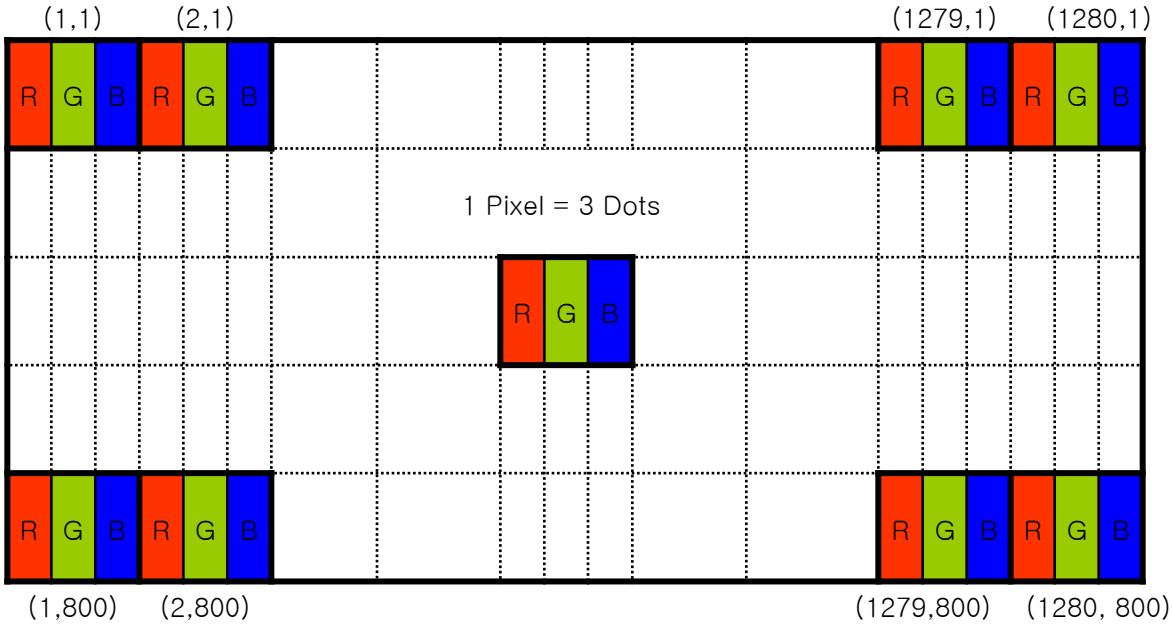
5.2 LVDS Interface



5.3 LVDS Input signal



5.4 Data Input Format

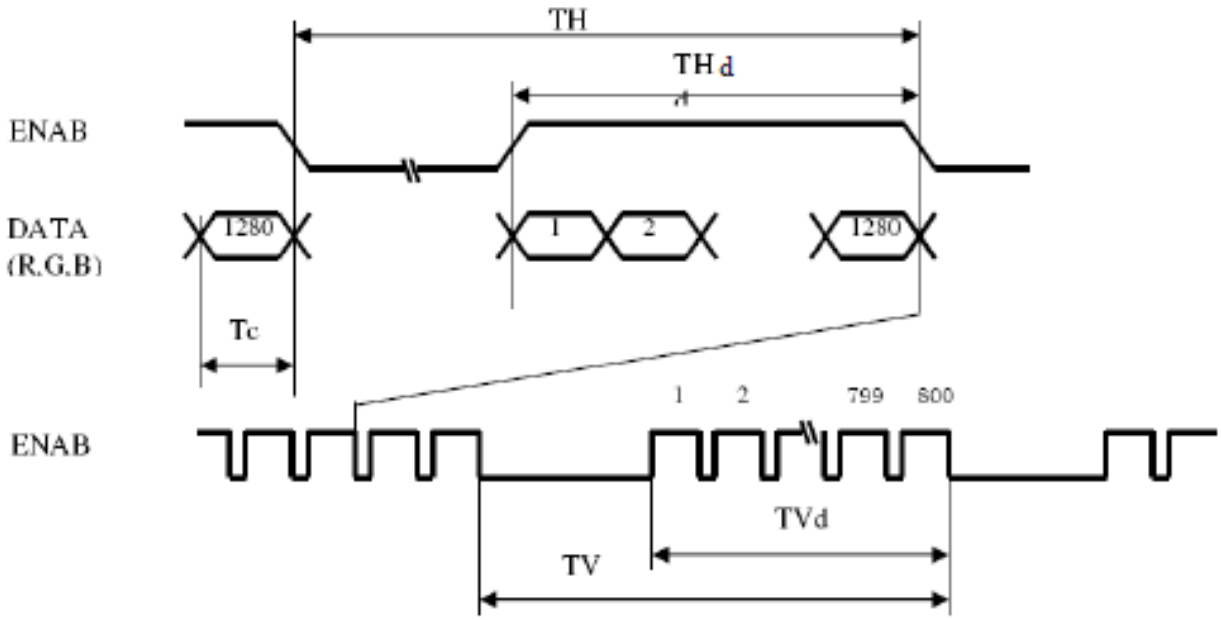


Display Position of Input Data (V-H)

6.0 SIGNAL TIMING SPECIFICATION

6.1 The BP101WX4-300 is operated by the DE mode.

Signal	Item	Symbol	Min	Type	Max	Unit
DCLK	Frequency	1/TC	60	65	70	MHz
	Cycle	Tc	16.66	15.38	14.3	ns
DE	Horizontal Period	THd	1280	1280	1280	Tc
	Horizontal Cycle	TH	1310	1330	1560	Tc
		TH_time	19.5	20.46	21.83	ns
	Vertical Period	TVd	800	800	800	Tc
	Vertical Cycle	TV	-	812	-	Tc

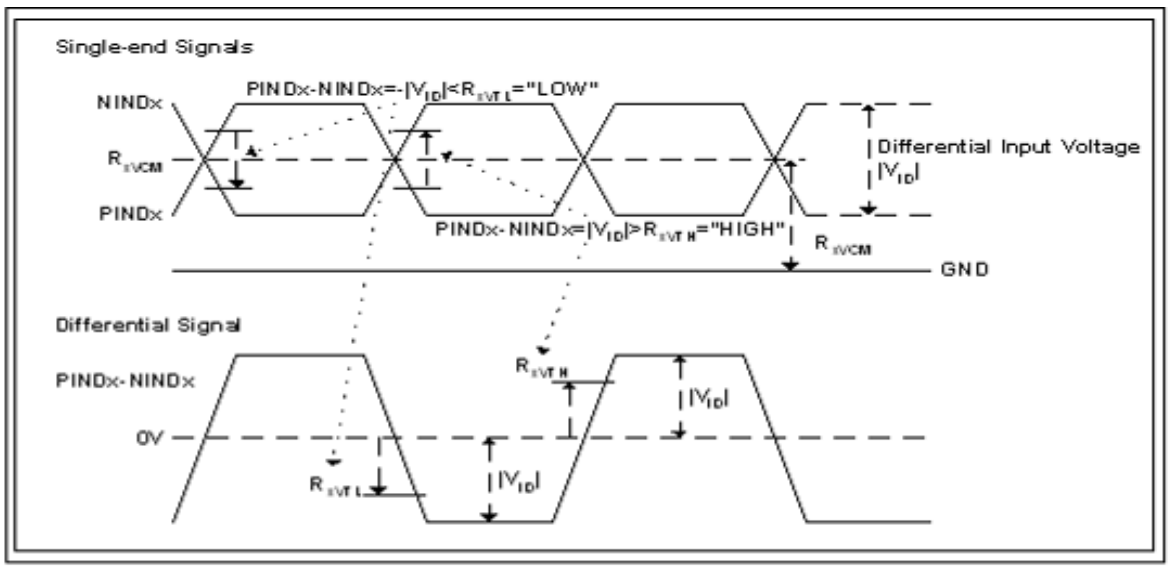


Interface Timing

6.2 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown in Table 6.

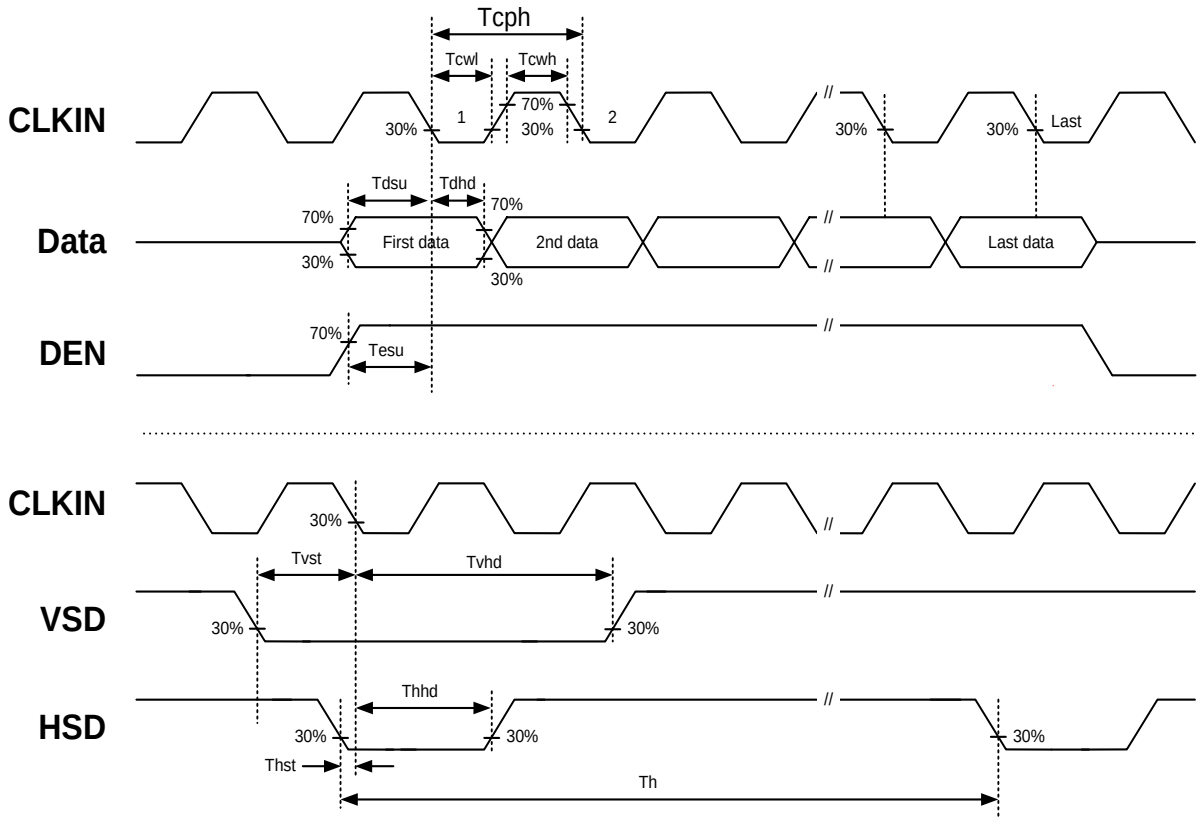
<Table 6. LVDS Rx Interface Timing Specification>



* Vdiff = (RXO/Ez+)-(RXO/Ez-),…. ,(RXO/ECLK+)-(RXO/ECLK-)

7.0 SIGNAL TIMING WAVEFORMS OF INTERFACE SIGNAL

7.1 Input Clock and Data Timing Diagram



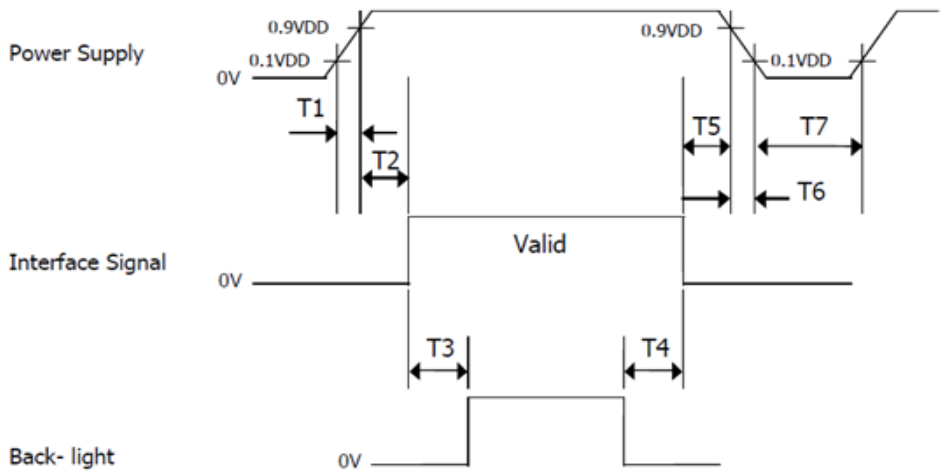
8.0 INPUT SIGNALS, BASIC DISPLAY COLORS & GRAY SCALE OF COLORS

Color & Gray Scale		Input Data Signal																							
		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	**UJU**
Type/ Part Number	**PF030-B45B-N09**

10.2 LED Connector

Pin No.	Symbol	For Signal Connector
1	VLEDN1	LED Cathode Power Supply
2	VLEDN2	LED Cathode Power Supply
3	VLEDN3	LED Cathode Power Supply
4	VLEDN4	LED Cathode Power Supply
5	NC	No Connection
6	NC	No Connection
7	VLED	LED Anode Power Supply
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 BP101WX4-300
Other parameters are shown in Table 7.

<Table 7. 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 (H) X0.1695 (V)	
Pixel arrangement	RGB Vertical stripe	
Display colors	16777216	
Display mode	Normally Black	
Dimensional outline	224.81(H)*144.25(V)*0.5（D） typ.	mm
Weight	70(Max)	gram

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 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 8. Reliability test>

No	Test Items	Conditions
1	High temperature storage test	Ta = 80 ℃, 240 hrs
2	Low temperature storage test	Ta = -20 ℃, 240 hrs
3	High temperature & high humidity operation test	Ta = 60 ℃, 90%RH, 240 hrs
4	High temperature operation test	Ta = 60 ℃, 240 hrs
5	Low temperature operation test	Ta = -20 ℃, 240hrs
6	Thermal shock	Ta = -20 ℃ ↔ 70 ℃ (30min), 100 cycle

13.0 HANDLING & CAUTIONS

(1) Cautions when taking out the panel
- Pick the pouch only, when taking out panel from a shipping package.

(2) Cautions for handling the module
- As the electrostatic discharges may break the LCD panel, handle the LCD panel with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.
- As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.
- Put the panel display side down on a flat horizontal plane.
- Handle connectors and cables with care.

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

(4) Cautions for the panel 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.

14.0 LABEL

(1) Product label

Remark：Product ID编码规则

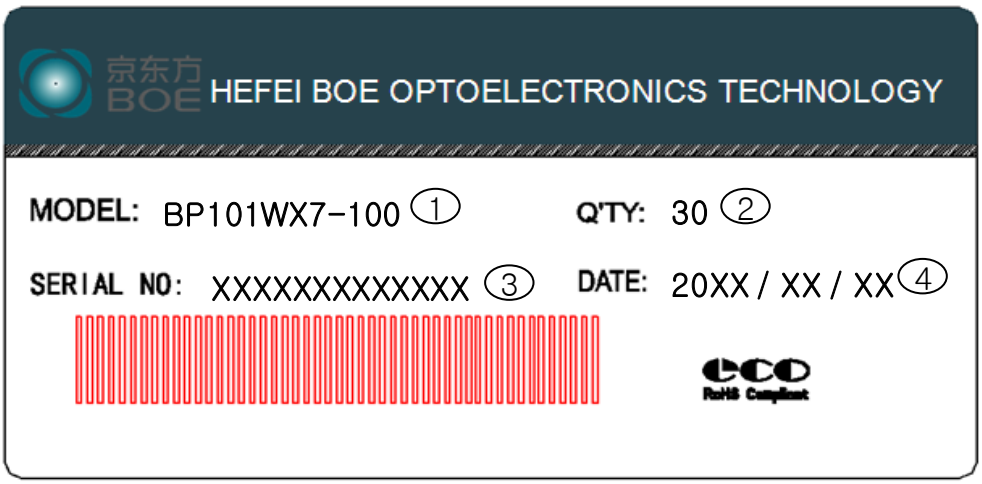
序列号	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
代码	4	F	P	3	1	2	7	3	8	3	0	0	0	1	E	E	J
描述	GBN代码		等级	B3	年份		月	FG Code后四位				序列号					

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

(3) Box label

Label Size: 110 mm (L) × 56 mm (W)
Contents
Model: BP101WX7-100
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



Remark：

1.FG-CODE

2.Box 产品数量

3.Box ID, 编码规则如下

4.Box Packing 日期

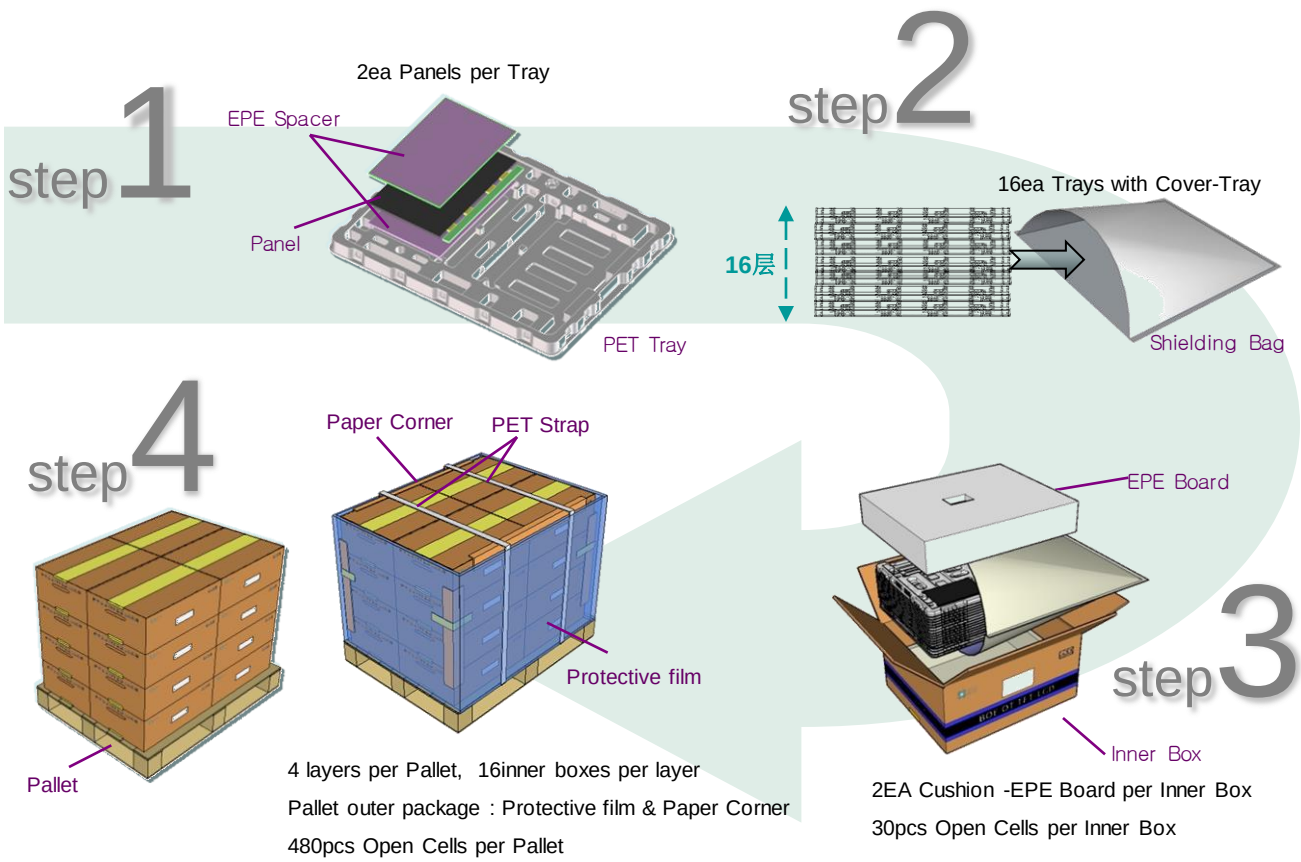
序列号	1	2	3	4	5	6	7	8	9	10	11	12	13
代码	x	x	x	3	x	x	x	x	x	x	x	x	x
描述	GBN代码		等级	B3	年份		月	Rev	序列号				

15.0 PACKING INFORMATION

15.1 Packing Description

Packing Condition	Contents
Packing type	PET + Antistatic Backing packing type
PET material model	PET (10^6~10^{11} Ω/ sq)
PET packing type	
Number of panels per PET	2 pieces
Number of PET per inner box	16units (15units + 1 unit empty)
Number of inner box per out box	16 pcs
Number of panels per inner box	30 pieces
Number of panels per out box	480 pieces

15.2 Packing order



4 layers per Pallet, 16inner boxes per layer
Pallet outer package : Protective film & Paper Corner
480pcs Open Cells per Pallet

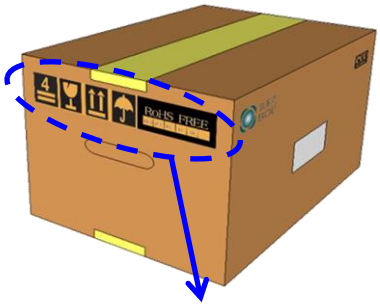
2EA Cushion -EPE Board per Inner Box
30pcs Open Cells per Inner Box

No.	Description	Quantity
1	TFT-LCD	480pcs/Pallet
2	Module/PET Tray	2pcs
3	PET Tray	16 ea (1ea : empty) / Inner Box
4	Inner Box	16ea/Pallet
5	PE Bag	16ea/Pallet
6	Paper Conner	6ea/Pallet
7	Belt tape	1,920-1,984 cm
8	Stretch Film	28 ~ 30M
9	Distribution label	1pcs

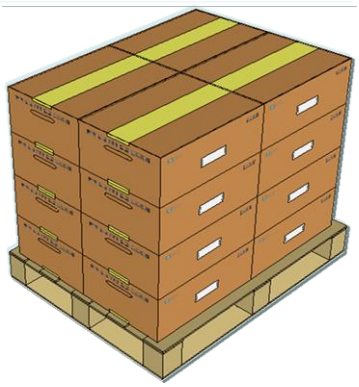
※ Standard packing dimensions is 510×410×252mm, it would be observed strictly.

15.3 Description of packing procedure (picture)

Inner Box



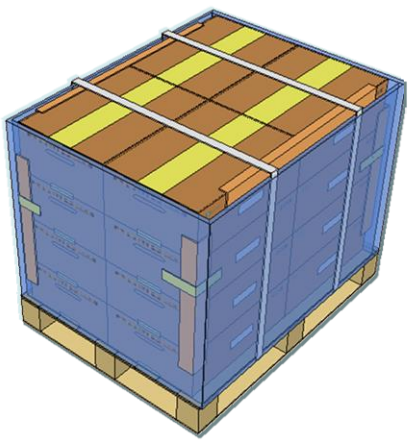
Inner Box On Pallet



Protective film

&

Paper Corner



16.0 HS XRF Control Standard

HS XRF 管控标准

限制物质和最大容许含量	RoHS 标准	BOE HF标准	XRF管控标准
镉（Cd）	100PPM	5PPM	P =ND<X<15ppm≦F
铅（Pb）	1000PPM	100PPM	P ≤ 70ppm < X < 130ppm ≤ F
汞（Hg）	1000PPM	ND	P =ND < X < 10ppm ≤ F
		(CCFL: < 3.5mg)	-
铬（Cr）	1000PPM	金属部品ND	P =ND < X
		非金属部品 <500ppm	P ≤350 < X
多溴联苯PBB (Poly Brominated Biphenyls)	1000PPM	ND	-
多溴二苯醚PBDE (Poly brominated Di-phenyl Ethers)	1000PPM	ND	-
氯及氯化合物	-	900PPM	P ≤630 < X < 1170ppm ≤ F
溴及溴化合物	-	900PPM	P ≤630 < X < 1170ppm ≤ F
氯及氯化合物+溴及溴化合物	-	1500PPM	P ≤1050 < X < 1950ppm ≤ F
锑（Sb）	-	700ppm	P ≤490 < X < 910ppm ≤ F

17.0 MECHANICAL OUTLINE DIMENSION

Figure 5. FOB Outline Dimension (Front View)

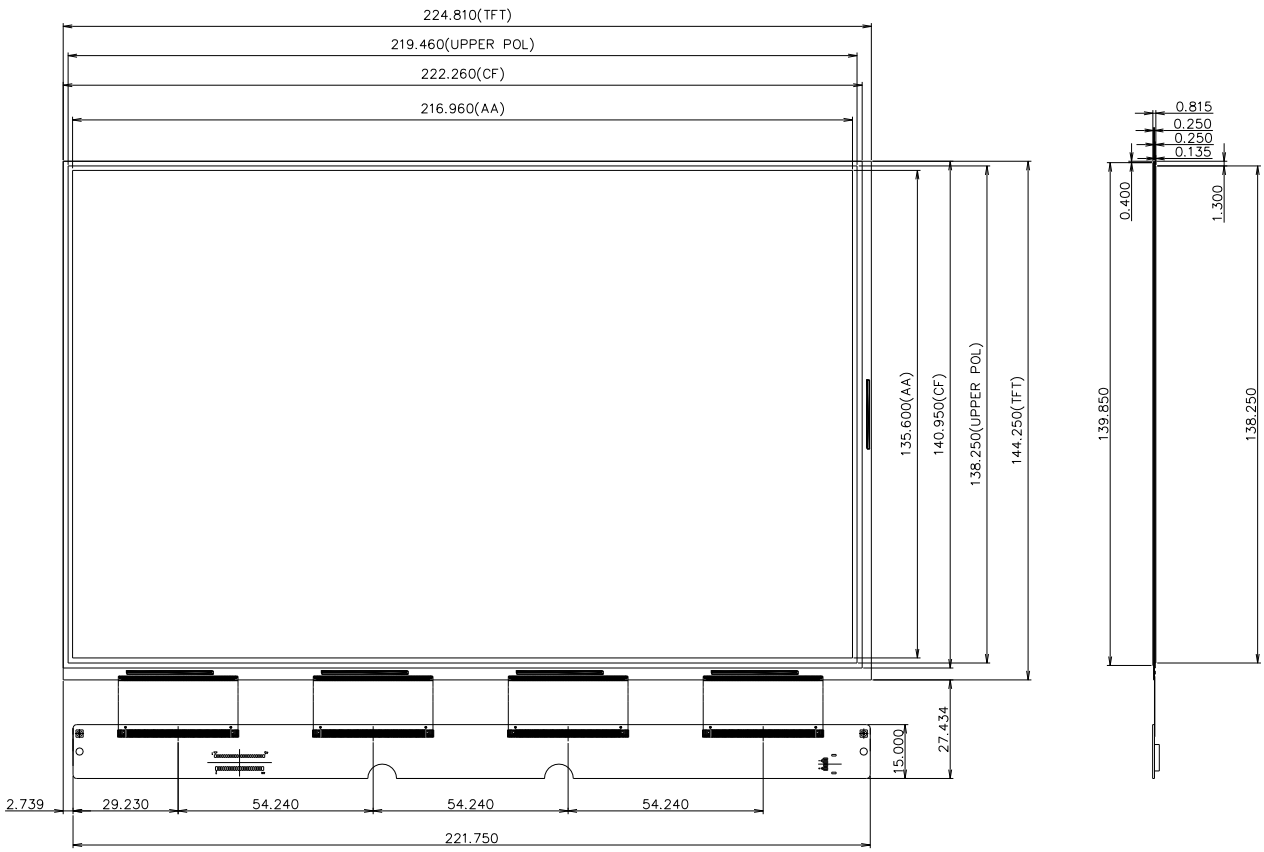


Figure 6. TFT-LCD Panel Outline Dimensions (Rear view)