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PRODUCT GROUP
TFT-LCD

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TITLE :**HV490FHB-N80 Preliminary Product Specification**

ChongQing BOE Optoelectronics Technology Co.,LTD.



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REVISION HISTORY

REV.	PAGE	DESCRIPTION OF CHANGES	DATE	PREPARED
P0	-	Initial Release	2015.06.17	C.Zuo/LJ.Xiao

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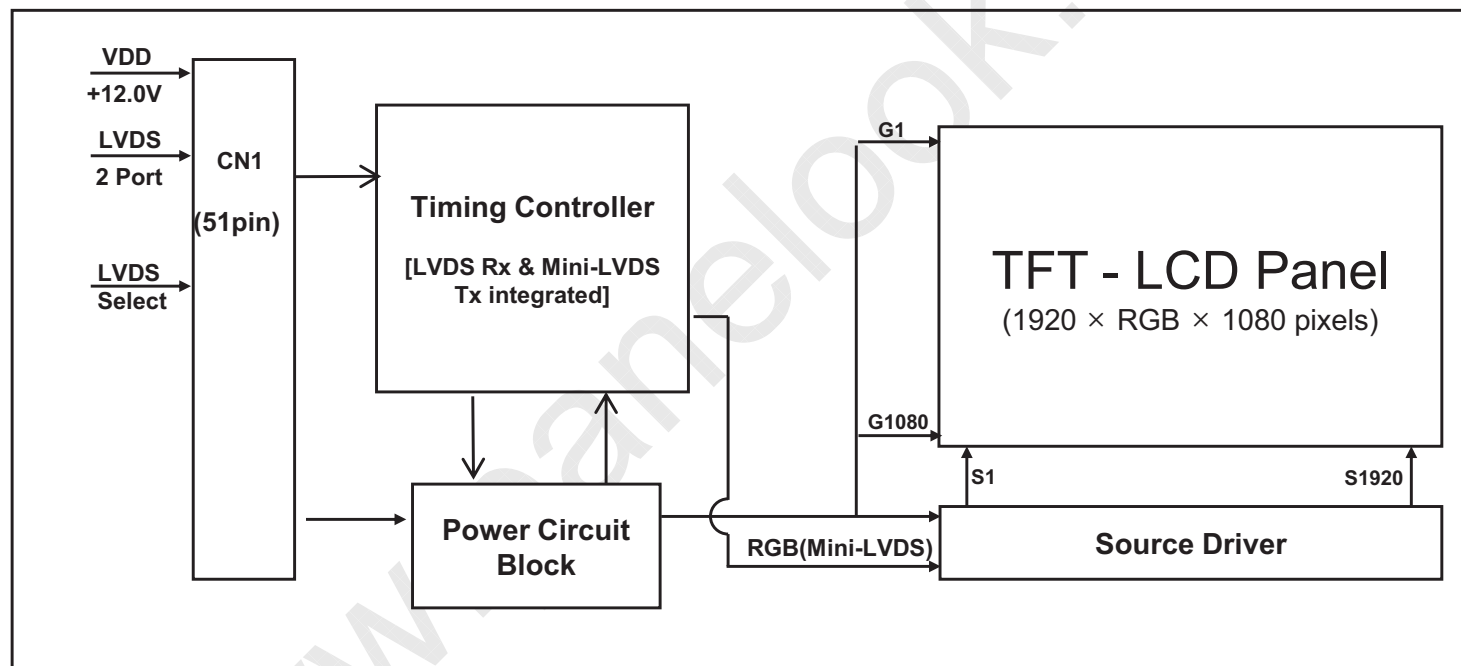
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1.0 GENERAL DESCRIPTION

1.1 Introduction

HV490FHB-N80 is a color active matrix TFT LCD open cell using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 48.50 inch diagonally measured active area with FHD resolutions (1920 horizontal by 1080 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

- GOA Dual Side Drive
- LVDS interface with 2 pixel / clock
- High-speed response
- Low color shift image quality
- 8-bit color depth, display 16.7M colors
- Narrow bezel and wide viewing angle, gate driver use GOA mode
- ADS technology is applied for high display quality
- RoHS compliant

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1.3 Application

- Home Alone Multimedia TFT-LCD TV
- Display Terminals for Control System
- Full High Definition TV(FHD TV)
- AV application Products

1.4 General Specification

< Table 1. General Specifications >

Parameter	Specification	Unit	Remark
Active area	1073.8(H) × 604(V)	mm	
Number of pixels	1920(H) × 1080(V)	pixels	
Pixel pitch	186.42(H) × 559.26(V)	μm	
Pixel arrangement	Pixels RGB Vertical stripe		
Display colors	16.7M (8bits True)	colors	
Display mode	Transmission mode, Normally Black		
Open Cell Transmittance	6.3 (Typ.)	%	At center point with BOE BLU
Weight	1.967 (Typ.)	Kg	
Power Consumption	TBD(Typ.)	Watt	
Surface Treatment	Haze 1%		

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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.

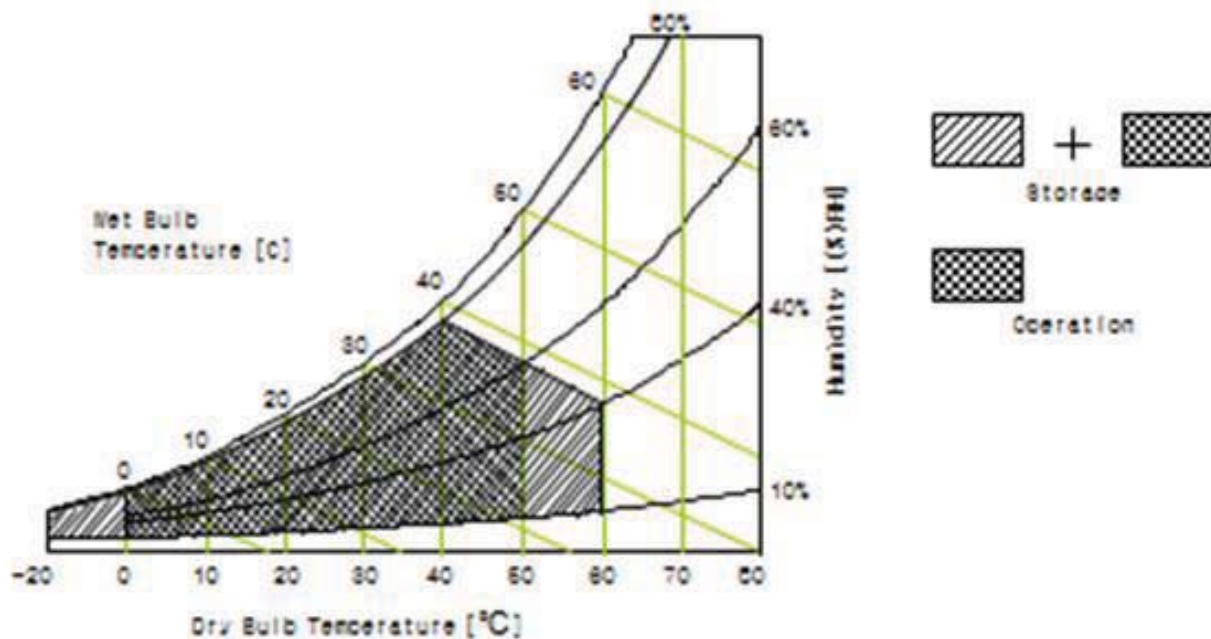
< Table 2. Open Cell Electrical Specifications >

[VSS=GND=0V]

Parameter	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage	VDD	VSS-0.3	13.5	V	Ta = 25 °C
Operating Temperature	T _{OP}	0	+50	°C	Note 1
Storage Temperature	T _{SUR}	0	+60	°C	
	T _{ST}	-20	+60	°C	
Operating Ambient Humidity	Hop	10	80	%RH	
Storage Humidity	Hst	10	80	%RH	

Note 1 : Temperature and relative humidity range are shown in the figure below.

Wet bulb temperature should be 39 °C max. and no condensation of water.



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3.0 ELECTRICAL SPECIFICATIONS**3.1 TFT LCD Open Cell**

< Table 3. Open Cell Electrical Specifications >

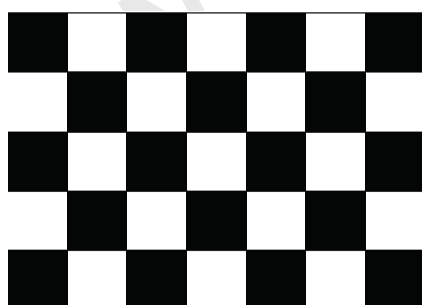
[Ta =25±2 °C]

Parameter	Symbol	Values			Unit	Remark	
		Min	Typ	Max			
Power Supply Input Voltage	VDD	10.8	12	13.2	Vdc		
Power Supply Ripple Voltage	VRP	-	-	300	mV		
Power Supply Current	IDD	-	TBD	-	A	Note 1	
Power Consumption	PDD	-	TBD	-	Watt		
Rush current	IRUSH	-	-	3.0	A	Note 2	
LVDS Interface	Differential Input High Threshold Voltage	VLVTH	+100	-	+300	mV	
	Differential Input Low Threshold Voltage	VLVTL	-300	-	-100	mV	
	Common Input Voltage	VLVC	1.0	1.2	1.4	V	
CMOS Interface	Input High Threshold Voltage	VIH	2.7	-	3.3	V	
	Input Low Threshold Voltage	VIL	0	-	0.6	V	

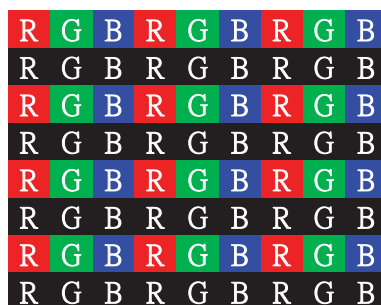
Note 1 : The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for VDD=12.0V,

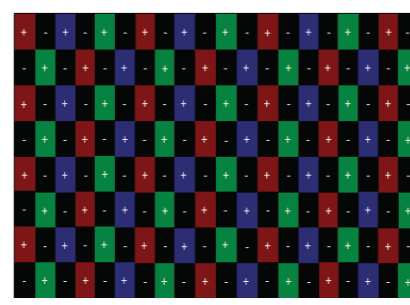
a) Typ : Mosaic 7X5 (L0/L255)



b) Max : Horizontal 1 Line (L0/L255)



c) Flicker Pattern



Note 2 : The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)

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4.0 INTERFACE CONNECTION**4.1 Open Cell Input Signal & Power**

- LVDS CN (51Pin) Connector : IS050-C51B-C39-S(UJU) or Equivalent.

< Table 4. Open Cell Input Connector Pin Configuration >

Pin No	Symbol	Description	Pin No	Symbol	Description
1	NC	No Connection	21	GND	Ground
2	NC	No Connection	22	LO[3]-	LVDS Odd Signal 3(-)
3	NC	No Connection	23	LO[3]+	LVDS Odd Signal 3(+)
4	NC	No Connection	24	NC	No Connection
5	NC	No Connection	25	NC	No Connection
6	NC	No Connection	26	GND	Ground
7	SEL_LVDS	H:JEIDA , L or NC:VESA	27	NC	No Connection
8	NC	No Connection	28	LE[0]-	LVDS Even Signal 0(-)
9	NC	No Connection	29	LE[0]+	LVDS Even Signal 0(+)
10	NC	No Connection	30	LE[1]-	LVDS Even Signal 1(-)
11	GND	Ground	31	LE[1]+	LVDS Even Signal 1(+)
12	LO[0]-	LVDS Odd Signal 0(-)	32	LE[2]-	LVDS Even Signal 2(-)
13	LO[0]+	LVDS Odd Signal 0(+)	33	LE[2]+	LVDS Even Signal 2(+)
14	LO[1]-	LVDS Odd Signal 1(-)	34	GND	Ground
15	LO[1]+	LVDS Odd Signal 1(+)	35	LECLK-	LVDS Even Clock Signal(-)
16	LO[2]-	LVDS Odd Signal 2(-)	36	LECLK+	LVDS Even Clock Signal(+)
17	LO[2]+	LVDS Odd Signal 2(+)	37	GND	Ground
18	GND	Ground	38	LE[3]-	LVDS Even Signal 3(-)
19	LOCLK-	LVDS Odd Clock Signal(-)	39	LE[3]+	LVDS Even Signal 3(+)
20	LOCLK+	LVDS Odd Clock Signal(+)	40	NC	No Connection

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Pin No	Symbol	Description	Pin No	Symbol	Description
41	SCL	SCL for PGMA	47	NC	No Connection
42	SDA	SDA for PGMA	48	VLCD	Power Supply +12V
43	GND	Ground	49	VLCD	Power Supply +12V
44	GND	Ground	50	VLCD	Power Supply +12V
45	GND	Ground	51	VLCD	Power Supply +12V
46	GND	Ground			

Notes : NC(Not Connected) : This pins are only used for BOE internal operations.

Rear view of LCM**BIST Pattern**

PT1:Black

PT2:White

PT3:Red

PT4:Green

PT5:Blue

PT6:Gray 127



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4.2 LVDS Interface

<Table 5. LVDS Receiver : Timing Controller (LVDS Rx merged) / LVDS Data : Pixel Data>

Channel No.	Data No.	8-bit LVDS Type	
		NS	JEIDA
0	Bit-0	R0	R2
	Bit-1	R1	R3
	Bit-2	R2	R4
	Bit-3	R3	R5
	Bit-4	R4	R6
	Bit-5	R5	R7
	Bit-6	G0	G2
1	Bit-0	G1	G3
	Bit-1	G2	G4
	Bit-2	G3	G5
	Bit-3	G4	G6
	Bit-4	G5	G7
	Bit-5	B0	B2
	Bit-6	B1	B3
2	Bit-0	B2	B4
	Bit-1	B3	B5
	Bit-2	B4	B6
	Bit-3	B5	B7
	Bit-4	HS	HS
	Bit-5	VS	VS
	Bit-6	DE	DE
3	Bit-0	R6	R0
	Bit-1	R7	R1
	Bit-2	G6	G0
	Bit-3	G7	G1
	Bit-4	B6	B0
	Bit-5	B7	B1
	Bit-6	-	

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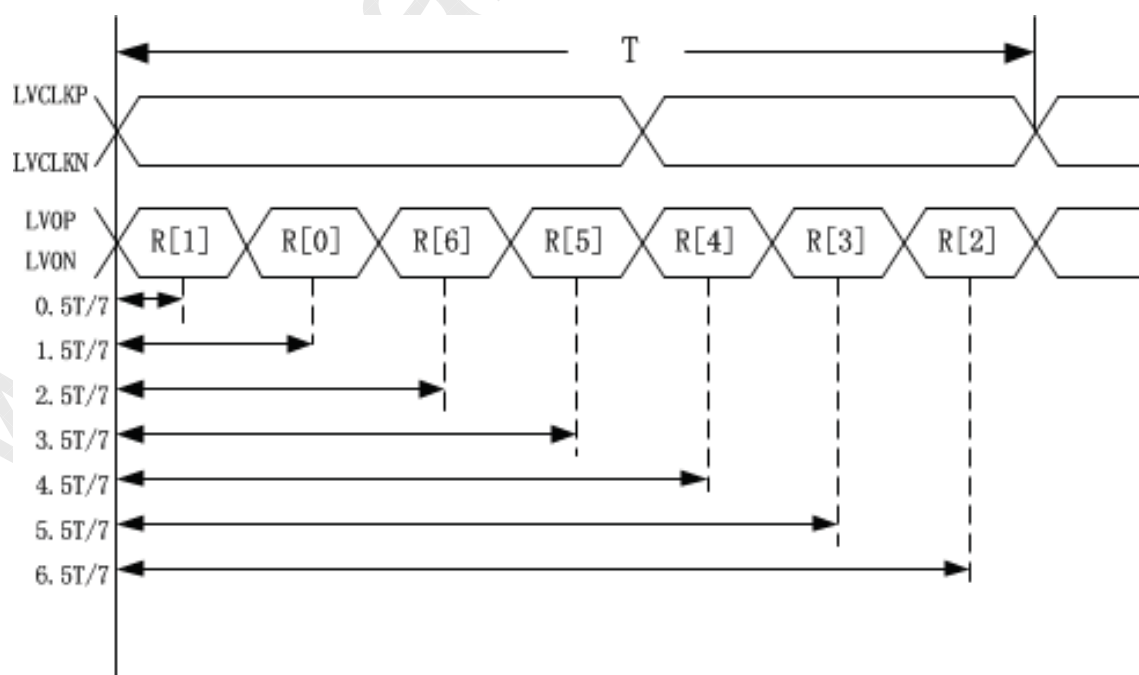
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4.3 LVDS Rx Interface Timing Parameter

The Specification of the LVDS Rx interface timing parameter is shown in Table6

< Table 6. LVDS Rx Interface Timing Specification >

Item	Symbol	Min	Typ	Max	Unit	Note
CLKIN Period	T	11.8	13.5	17.9	nsec	
Input Data0	tRCIP1	0.5T/7-0.4	0.5T/7	0.5T/7+0.4	nsec	
Input Data1	tRCIP0	1.5T/7-0.4	1.5T/7	1.5T/7+0.4	nsec	
Input Data2	tRCIP6	2.5T/7-0.4	2.5T/7	2.5T/7+0.4	nsec	
Input Data3	tRCIP5	3.5T/7-0.4	3.5T/7	3.5T/7+0.4	nsec	
Input Data4	tRCIP4	4.5T/7-0.4	4.5T/7	4.5T/7+0.4	nsec	
Input Data5	tRCIP3	5.5T/7-0.4	5.5T/7	5.5T/7+0.4	nsec	
Input Data6	tRCIP2	6.5T/7-0.4	6.5T/7	6.5T/7+0.4	Nsec\	



Notes: Input frequency range from 25MHz to 110MHz

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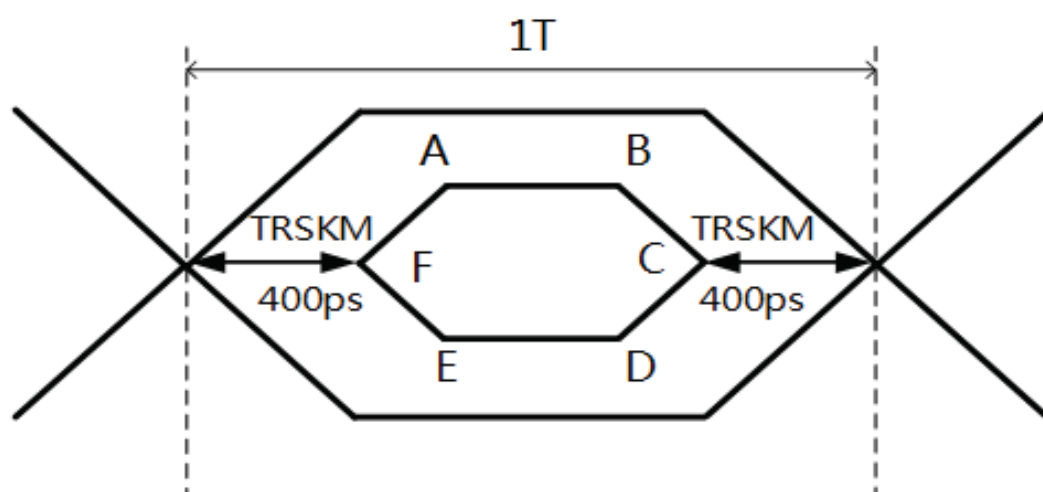
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4.4 LVDS Rx Interface Eye Diagram

< Table 7. LVDS Rx Interface Eye Diagram >

Symbol	Min	Typ	Max	Unit	Note
A	—	100	—	mV	
B	—	100	—	mV	
C	—	0	—	mV	
D	—	-100	—	mV	
E	—	-100	—	mV	
F	—	0	—	mV	



- Notes: 1. Time F to A,B to C,C to D,E to F is 150p second.
 2. LVDS clock=85Mhz.
 3. The time A to B= $1T-2*TRSKM-2*150ps$.

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5.0 SIGNAL TIMING SPECIFICATION**5.1 Timing Parameters(DE only mode)**

< Table 7. Timing Table >

Item		Symbols		Min	Typ	Max	Unit
Clock	Frequency	1/Tc		56.00	74.25	85	MHz
	High Time	Tch		-	4/7Tc	-	
	Low Time	Tcl		-	3/7Tc	-	
Frame Period		Tv		1085	1125	1341	lines
				56.32	60	62.77	Hz
Horizontal Active Display Term		Valid	t _{HV}	-	960	-	t _{CLK}
		Total	t _{HP}	1050	1100	1647	t _{CLK}
Vertical Active Display Term		Valid	t _{VV}	-	1080	-	t _{HP}
		Total	t _{VP}	1085	1125	1341	t _{HP}

Notes: This product is DE only mode. The input of Hsync & Vsync signal does not have an effect on normal operation.

< Table 8. LVDS Input SSCG >

Symbol	Parameter	Condition	Min	Typ	Max	Unit
F	LVDS Input frequency	-	56	74.25	85.0	MHz
T _{LVSK}	LVDS channel to channel skew	F=65MHz V _{IC} =1.2V V _{ID} =±200mV	-600	-	+600	ps
F _{LVMOD}	Modulating frequency of input clock during SSC	F=85MHz V _{IC} =1.2V V _{ID} =±200mV	10	-	300	KHz
F _{LVDEV}	Maximum deviation of input clock frequency during SSC		-3	-	+3	%
T _{CY-CY}	Cycle to Cycle jitter		-	-	200	ps

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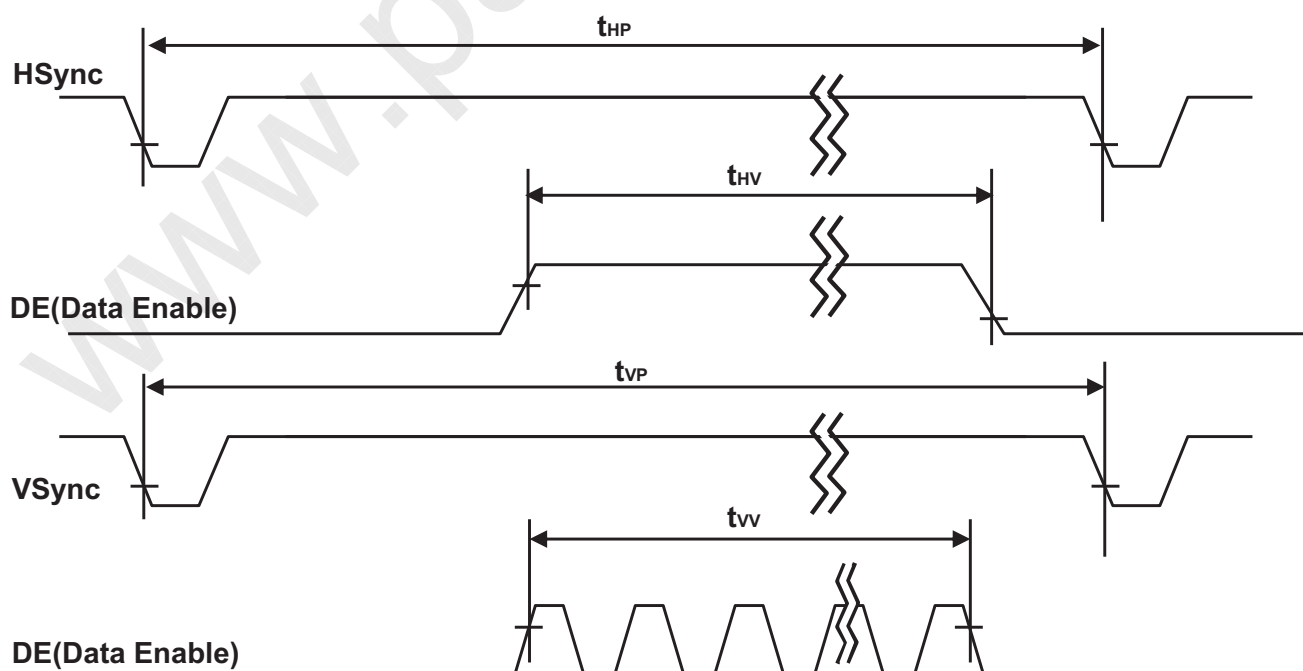
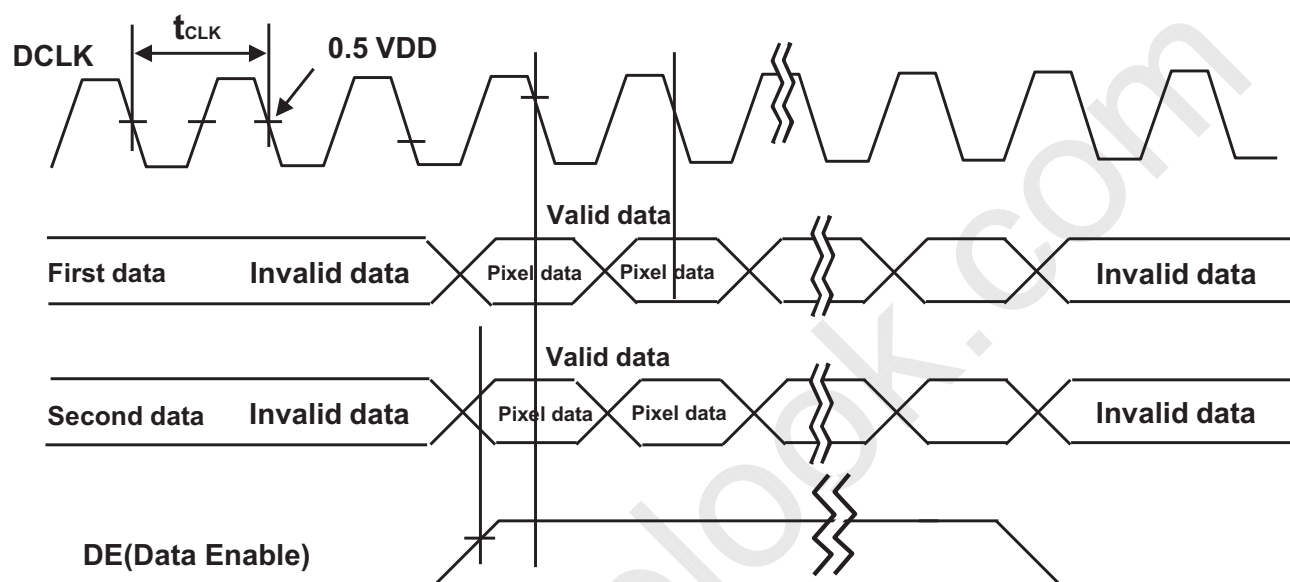
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5.2 Signal Timing Waveform



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5.3 Input Signals, Basic Display Colors and Gray Scale of Colors

< Table 8. Input Signal and Display Color Table >

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	
	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Darker	0	0	0	0	0	0	0	1	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	0	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	1	0	0	0	0	0	0	0	
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	0	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	0	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	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	
	△	↑								↑								↑							
	▽	↓								↓								↓							
	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	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	
	△	↑								↑								↑							
	▽	↓								↓								↓							
	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	0	1	1	1	1	1	1	1	0	1	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

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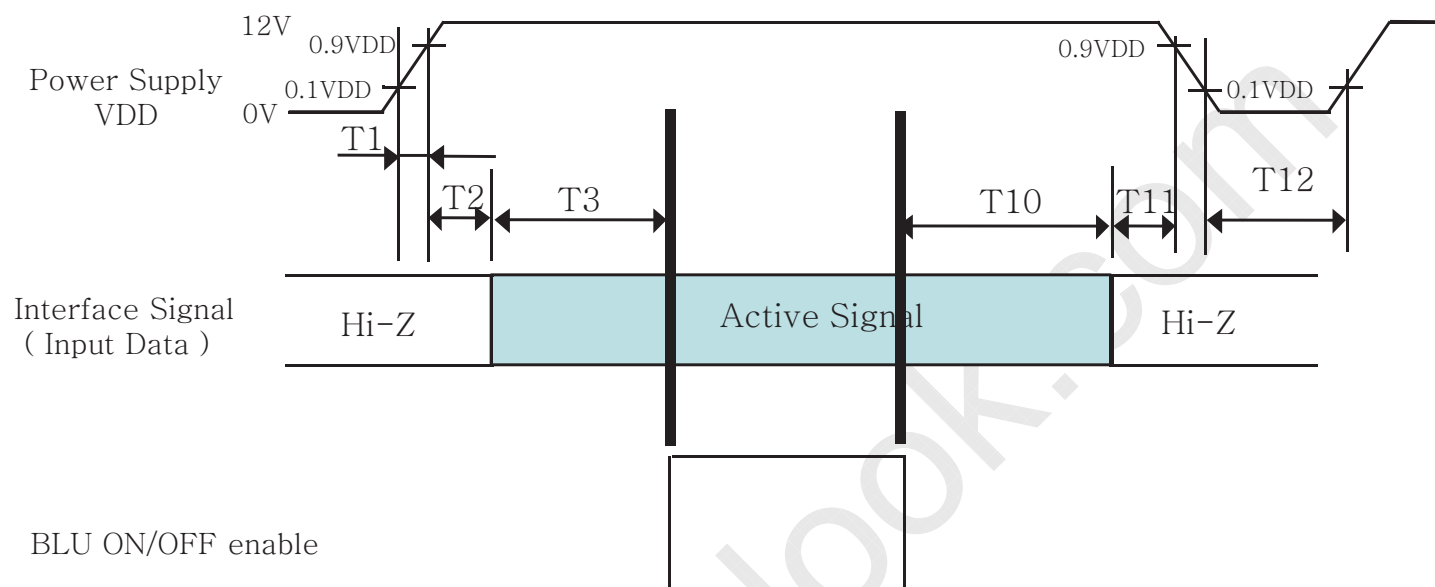
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5.4 Power Sequence



< Table 9. Sequence Table >

Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	10	ms
T2	0	-	50	ms
T3	200	-	-	ms
T10	200	-	-	ms
T11	0	-	50	ms
T12	1	-	-	s

Notes: 1. Even though T1 is over the specified value, there is no problem if I2T spec of fuse is satisfied.

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6.0 OPTICAL SPECIFICATIONS

The test of optical specifications shall be measured in a dark room (ambient luminance \leq 1 lux and temperature $=25\pm 2^{\circ}\text{C}$) with the equipment of Luminance meter system (Goniometer system and PR730) and test unit shall be located at an approximate distance 180cm from the LCD surface at a viewing angle of θ and Φ equal to 0° . We refer to $\theta_{\Phi=0}$ ($=\theta_3$) as the 3 o'clock direction (the "right"), $\theta_{\Phi=90}$ ($=\theta_{12}$) as the 12 o'clock direction ("upward"), $\theta_{\Phi=180}$ ($=\theta_9$) as the 9 o'clock direction ("left") and $\theta_{\Phi=270}$ ($=\theta_6$) as the 6 o'clock direction ("bottom"). While scanning θ and/or Φ , the center of the measuring spot on the Display surface shall stay fixed. The measurement shall be executed after 30 minutes warm-up period. VDD shall be 12.0V at 25°C . Optimum viewing angle direction is 6 'clock.

< Table 10. Optical Table >

[VDD = 12.0V, Frame rate = 60Hz, Ta = $25\pm 2^{\circ}\text{C}$]

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	θ_3	CR > 10		89		Deg.	Note 1
		θ_9			89		Deg.	
	Vertical	θ_{12}			89		Deg.	
		θ_6			89		Deg.	
Contrast ratio		CR		800:1	1200:1	-		Note 2
Reproduction of color	White	W_x	$\theta = 0^{\circ}$ (Center) Normal Viewing Angle	TYP. - 0.03	0.268	TYP. + 0.03		Note 3
		W_y			0.280			
	Red	R_x			0.644			
		R_y			0.336			
	Green	G_x			0.286			
		G_y			0.617			
	Blue	B_x			0.151			
		B_y			0.079			
Response Time	G to G	T_g		-	8	10	ms	Note 4
Gamma Scale				2.0	2.2	2.4		
Cell Transmittance					6.3		%	Note 5



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Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing 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.
2. Contrast measurements shall be made at viewing angle of $\theta = 0^\circ$ 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 shown in Appendix) 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 color chromaticity coordinates specified in Table 9 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.
4. Response time Tg is the average time required for display transition by switching the input signal as below table and is based on Frame rate fV =60Hz to optimize. Each time in below table is defined as Figure 2 and shall be measured by switching the

Measured Response Time	Target																
	0	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255
0																	
15																	
31																	
47																	
63																	
79																	
95																	
111																	
127																	
143																	
159																	
175																	
191																	
207																	
223																	
239																	
255																	

5. Definition of Transmittance (T%) :

Module is with white(L255) signal input

$$\text{Transmittance} = \frac{\text{Luminance of LCD Module}}{\text{Luminance of BLU}} \times 100 \%$$

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7.0 MECHANICAL CHARACTERISTICS**7.1 Dimensional Requirements**

Figure 4(located in Appendix) shows mechanical outlines for the model HV490FHB-N80. Other parameters are shown in Table 10.

< Table 11. Dimensional Parameters >

Parameter	Specification	Unit
Active area	1073.8 (H) × 604(V)	mm
Pixel pitch	186.42 (H) × 559.26 (V)	μm
Number of pixels	1920(H) × 1080(V) (1 pixel = R + G + B dots)	pixels
Weight	1.967 (Typ.)	kg

7.2 Surface Treatment and Polarizer Hardness

The surface of the LCD has an Low haze coating to Reduce scratching. Front Polarizer hardness is at least 2H.

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8.0 RELIABILITY TEST

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

< Table 12. Reliability Test Parameters >

Item	Test Condition
High-Temp/STG	Ta = 60 °C, 240 hrs
Low-Temp/STG	Ta = -20 °C, 240 hrs
High-Temp/HMD	Ta = 50 °C, 80%RH, 240hrs
High-Temp/OP	Ta = 50 °C, 240hrs
Low-Temp/OP	Ta = 0 °C, 240hrs
TST	Ta = -20 °C ↔ 60 °C (0.5 hr), 100 cycle
Black Fog Mura (Von Margin test)	Ta = 50 °C, 6000hrs

This test condition is based on BOE module.

- 【※】 Black Fog Mura : This is base on Von Margin test and condition should be over 6V after 6000hrs operating in a temperature of 50°C for SEC.
Related to Black Fog Mura , BOE guarantee for 30,000hrs.

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9.0 PRODCUT SERIAL NUMBER



MDL ID Naming Rule:

Digit Code	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	S	L	S	F	1	2	3	5	9	0	0	0	0
Description	Model Code /GBN		Grade	Line	Year		Month	Model Extension Code		Serial No 0001-ZZZZ			

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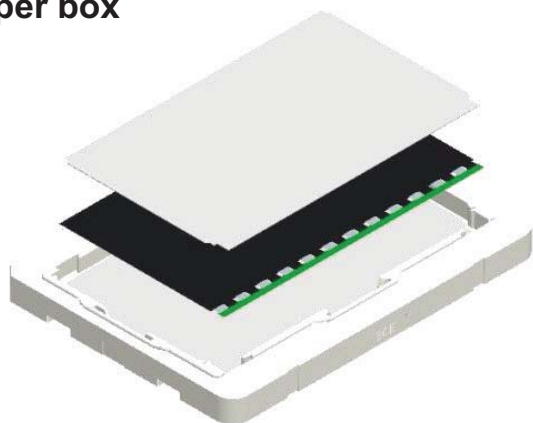
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10.0 PACKING INFORMATION

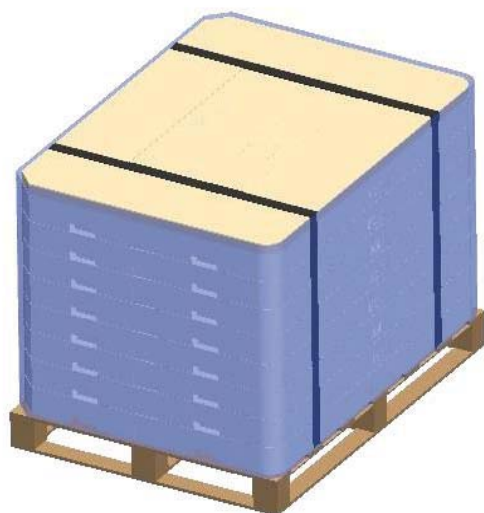
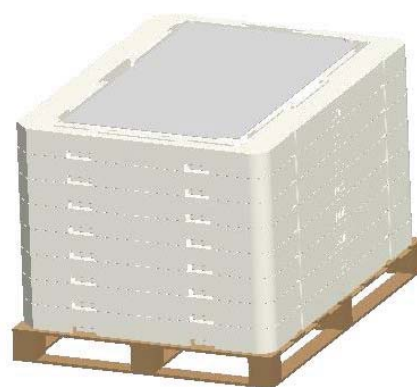
BOE provides the standard shipping container for customers, unless customer specifies their packing information. The standard packing method and Barcode information are shown in below.

10.1 Packing Order

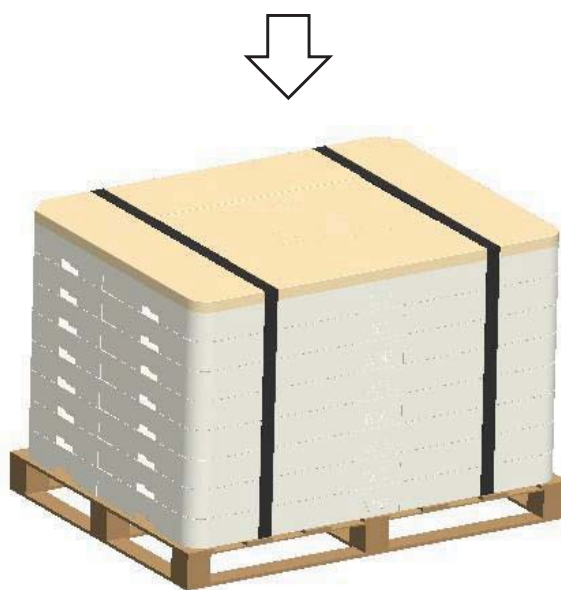
Put EPE pad and panels into the box, 15pcs panels per box



Put the box on the pallet, 7ea boxes per pallet



Use wrapping film to bind up them



Put one cover on the top of boxes, pack with paper corner & belt

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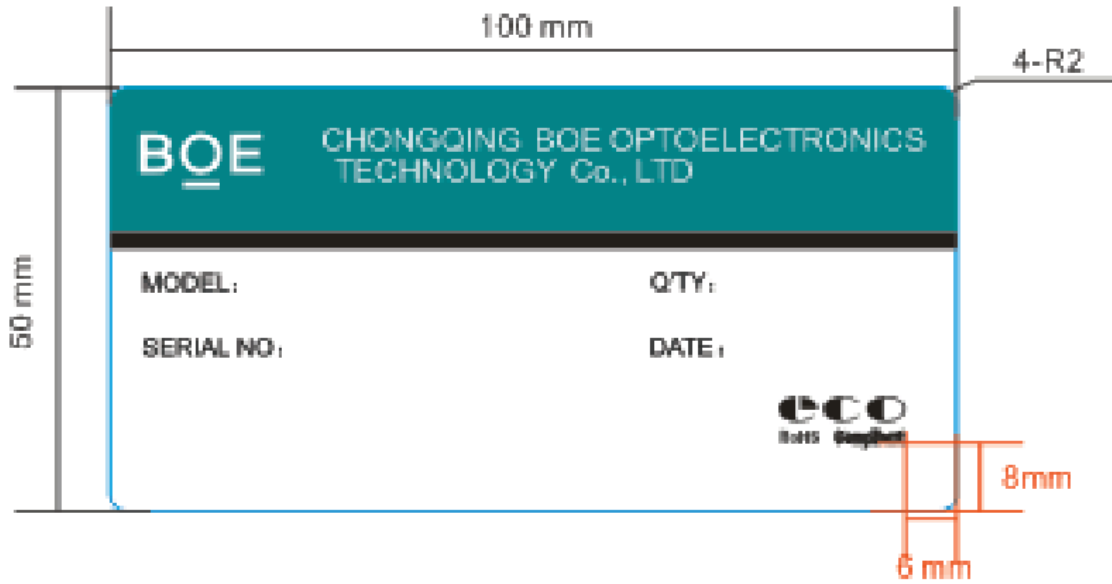
10.2 Packing Note

- Box Dimension : 1230mmL × 880mmW × 130mmH
- Package Quantity in one Box : 15pcs

10.3 Box Label

- Label Size : 100 mm (L) × 50 mm (W)
- Contents

Model : HV490FHB-N80
 Q`ty : 15 Open Cell in one box.
 Serial No. : Box Serial No.
 Date : Packing Date
 FG Code : FG Code of Product ()



Box ID Naming Rule:

Digit	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	S	L	S	F	1	2	3	D	0	0	0	6	8
Description	Products GBN		Grade	Line	Year		Month	Revision Code	Serial No				

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11.0 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 panel

- 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 LCD panel and back - light element are made from fragile glass material, impulse and pressure to the LCD panel 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 panel is operating.
- Put the panel display side down on a flat horizontal plane.
- Handle connectors and cables with care.

(3) Cautions for the operation

- When the panel 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 panel would be damaged.

(4) 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.

(5) Cautions for the panel characteristics

- Do NOT apply fixed pattern data signal to the LCD panel at product aging.
- Applying fixed pattern for a long time may cause image sticking.

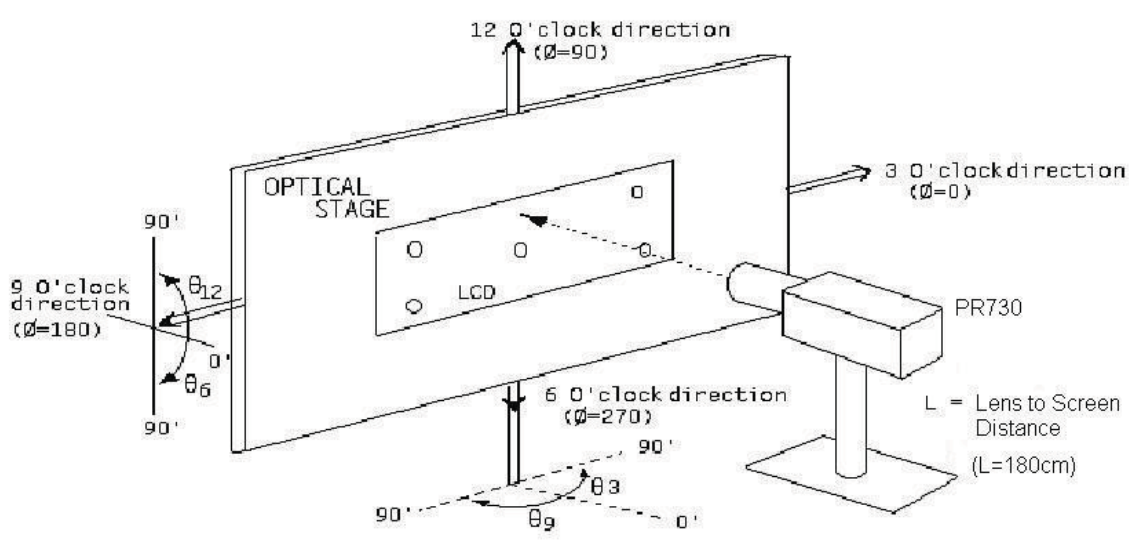
(6) Other cautions

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

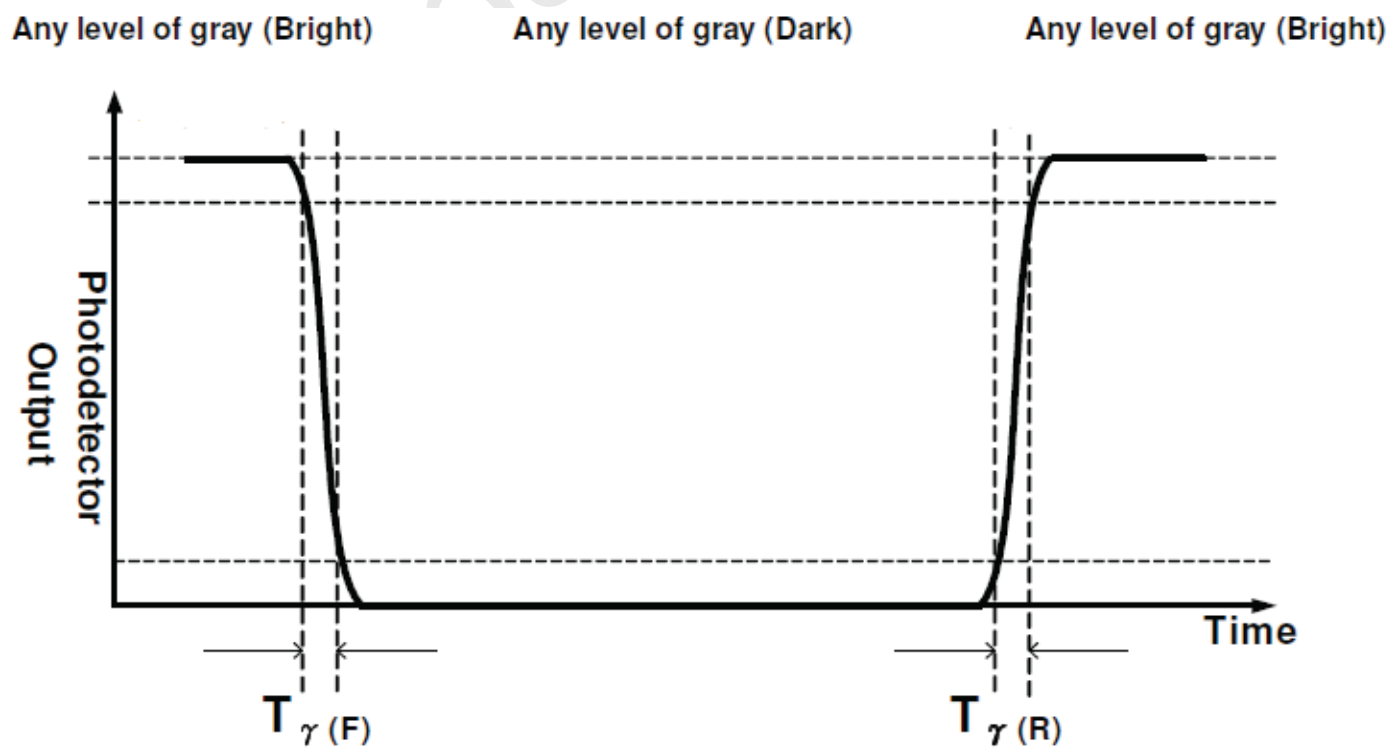
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12.0 APPENDIX

< Figure 1. Measurement Set Up >



< Figure 2. Response Time Testing >



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< Figure 3. TFT-LCD Open Cell Outline Dimensions (Front View) >

