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SPEC. NUMBER

S871-C038

PRODUCT GROUP

TFT-LCD

Rev. 0

ISSUE DATE

2016.06.09

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TITLE :DV490FHM-NN0

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	2016.06.09	C.Zuo/LJ.Xiao

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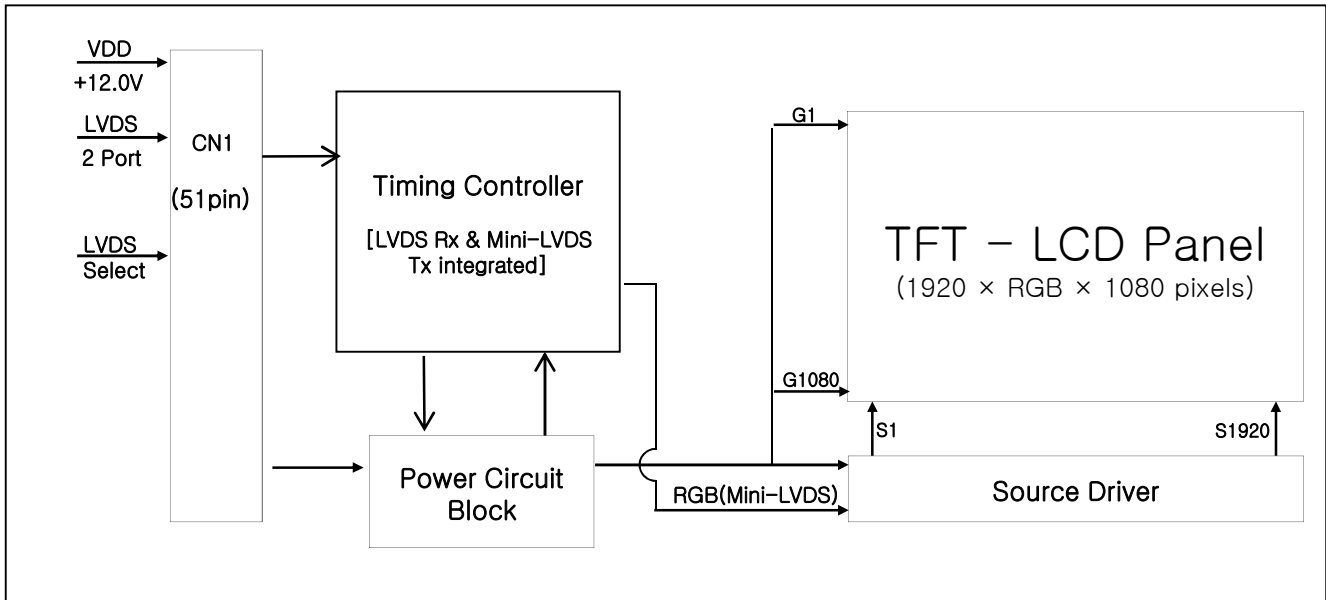
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1.0 GENERAL DESCRIPTION

1.1 Introduction

HV490FHB-N80 is a color active matrix TFT LCD module 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		
Dimensional outline	1090.4(H)*621.3(V)*27.355(Max)	mm	
Weight	9800(Max.)	g	
Power Consumption	5.4(Typ.)	Watt	
Surface Treatment	Haze 1%		

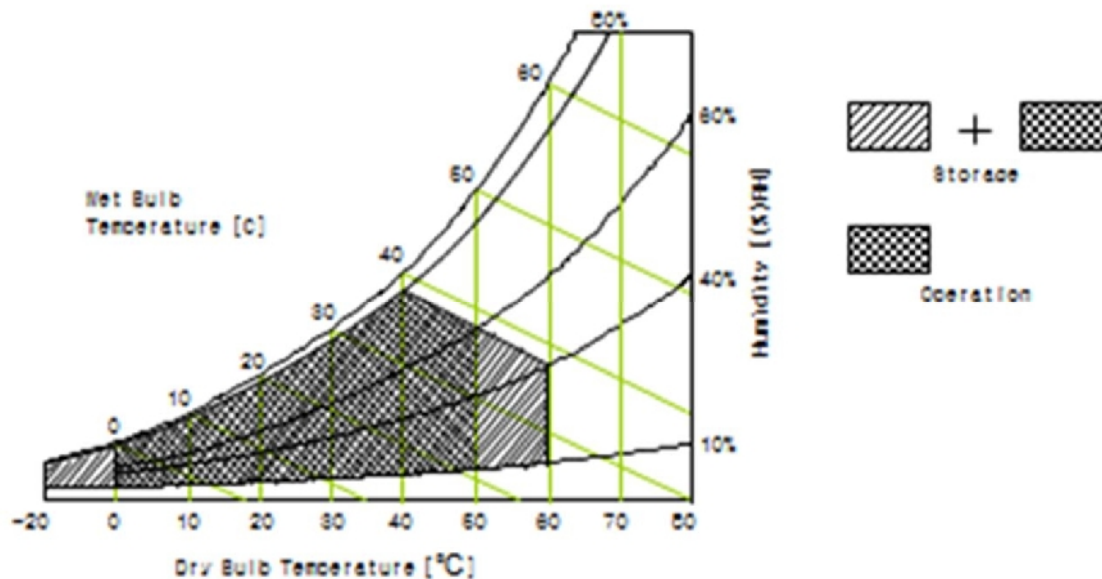
2.0 ABSOLUTE MAXIMUM RATINGS

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. 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	-	-	600	mV		
Power Supply Current	IDD	-	450	780	mA	Note 1	
Power Consumption	PDD	-	5.4	10.3	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	

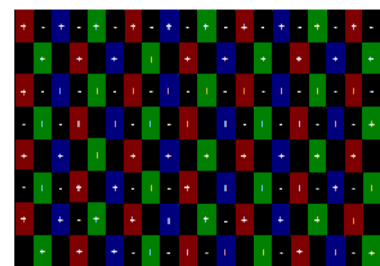
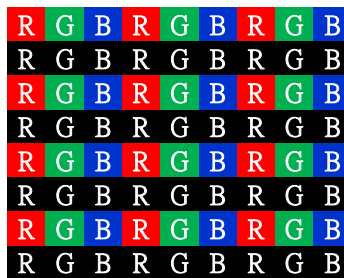
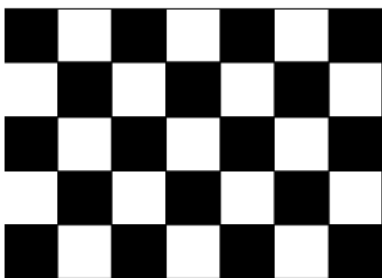
Note 1 : The supply voltage is measured and specified at the interface connector of LCM.

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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3.2 Backlight Unit

< Table 4. LED Driving guideline specifications >

Ta=25+/-
2°C

Parameter		Min.	Typ.	Max.	Unit	Remarks	
LED Forward Voltage	V _F	-	3.3	-	V	-	
LED Forward Current	I _F	-	-	120	mA	-	
LED Power Consumption	P _{LED}		-	0.40	W	Note 1	
LED Life-Time	N/A	15,000	-	-	Hour	I _F = 120mA	
Power supply voltage for LED Driver		V _{LED}	71.3	75.9	80.5	V	
EN Control Level	Backlight on		-	-	5.0	V	
	Backlight off		0			V	
PWM Control Level	PWM High Level		-	-	5.0	V	
	PWM Low Level		0	-	-	V	
PWM Control Frequency		F _{PWM}	100	-	10,000	Hz	
Duty Ratio			1	-	100	%	Note3

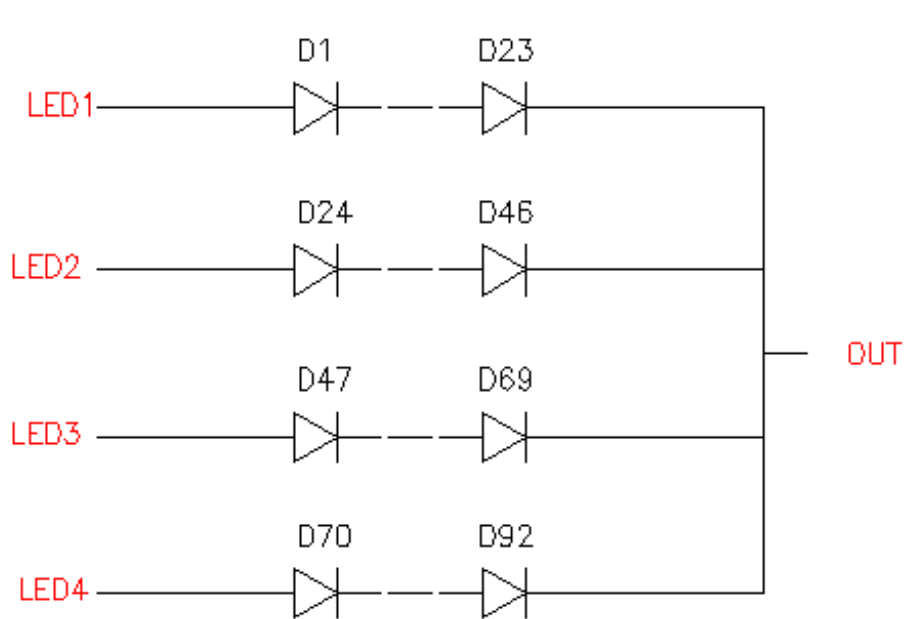
Notes : 1. Power supply voltage 49.5V for LED Driver

Calculator Value for reference $I_F \times V_F \times 184 / \text{efficiency} = P_{LED}$

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

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3.3 LED structure



LED Numbers: 92X2 =184 2 bar / BLU
Total : 184 LED / BLU

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4.0 OPTICAL SPECIFICATION

4.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1 lux and temperature = $25 \pm 2^\circ\text{C}$) 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° . We refer to $\theta\emptyset=0$ ($=\theta_3$) as the 3 o'clock direction (the "right"), $\theta\emptyset=90$ ($=\theta_{12}$) as the 12 o'clock direction ("upward"), $\theta\emptyset=180$ ($=\theta_9$) as the 9 o'clock direction ("left") and $\theta\emptyset=270$ ($=\theta_6$) as the 6 o'clock direction ("bottom"). While scanning θ and/or \emptyset , 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 $3.3 \pm 0.3\text{V}$ at 25°C . Optimum viewing angle direction is 6 'clock.

4.2 Optical Specifications

<Table 5. Optical Specifications>

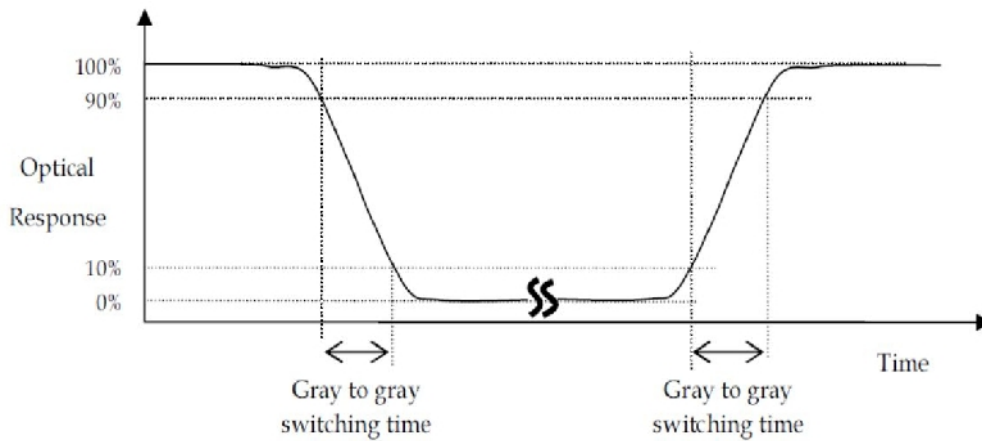
Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	-	89	-	Deg.	Note 1
		Θ_9		-	89	-	Deg.	
	Vertical	Θ_{12}		-	89	-	Deg.	
		Θ_6		-	89	-	Deg.	
Luminance Contrast ratio		CR	$\Theta = 0^\circ$	-	1200			Note 2
Luminance of White	9 Points	Y_w	$\Theta = 0^\circ$ $I_{LED} = 960\text{mA}$	-	380	-	cd/m ²	Note 3
White Chromaticity		x_w	$\Theta = 0^\circ$		0.268			Note 4
		y_w			0.280			
Reproduction of color	Red	x_R	$\Theta = 0^\circ$	-0.03	0.644	+0.03		
		y_R			0.336			
	Green	x_G			0.286			
		y_G			0.617			
	Blue	x_B			0.151			
		y_B			0.079			
Gamut					68		%	
Response Time (Rising + Falling)		T_{RT}	$T_a = 25^\circ\text{C}$ $\Theta = 0^\circ$	-	8	-	ms	Note 5

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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 Definition of Gray-to-Gray Switching Time (VA Model) :



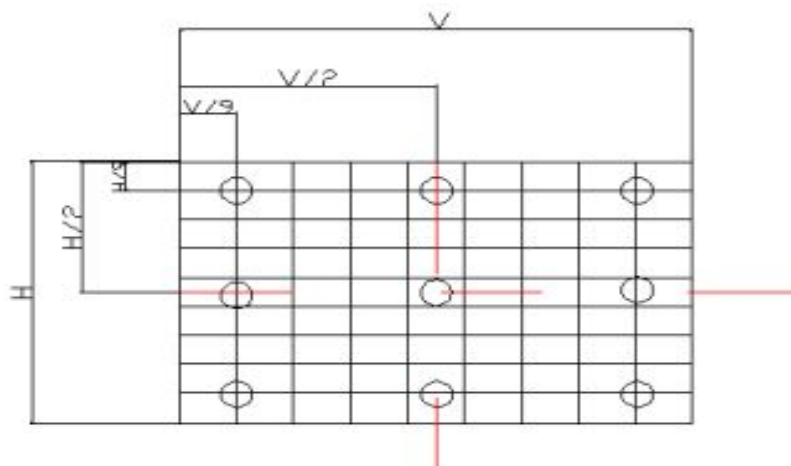
The driving signal means the signal of gray level 0, 31, 63, 95, 127, 159, 191, 223 and 255.

Gray to gray average time means the average switching time of gray level 0, 31, 63, 95, 127, 159, 191, 223 and 255 to each other.

3. Definition of White Variation (δW) :

Measure the luminance of gray level 255 at 9 points

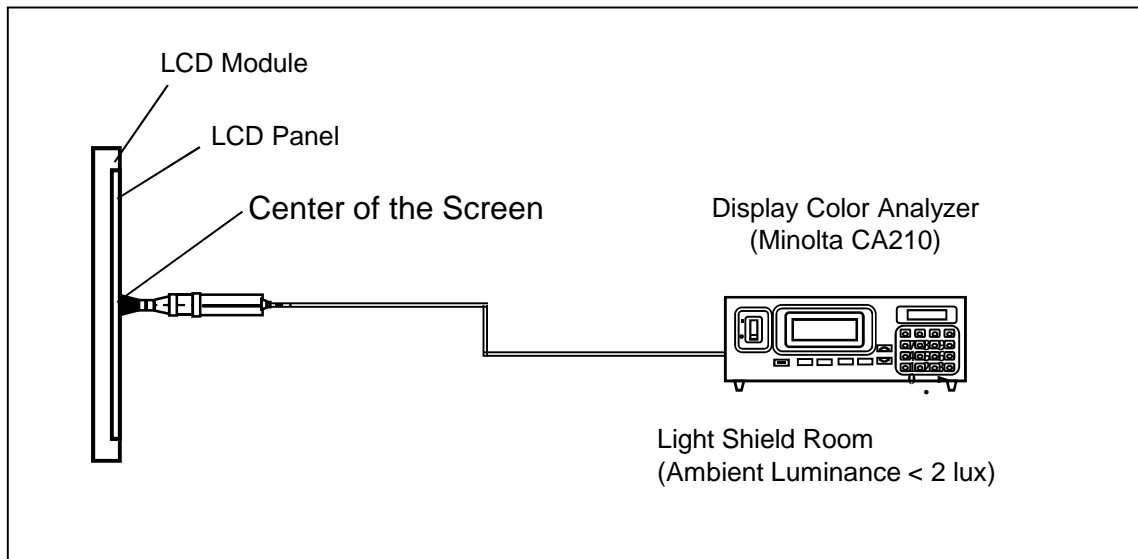
$$\delta W = \text{Maximum}(L_{on1}, L_{on2}, \dots, L_{on9}) / \text{Minimum}(L_{on1}, L_{on2}, \dots, L_{on9})$$



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4 Measurement Setup

The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a windless room.



5. Definition of Luminance of White (L_C):

Measure the luminance of gray level 255 at center point and 9 points

$L_C = L(5)$, where $L(X)$ is corresponding to the luminance of the point X at the figure in

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5.0 INTERFACE CONNECTION

5.1 Open Cell Input Signal & Power

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

< Table 4. Open Cell Input Connector Pin Configuration >

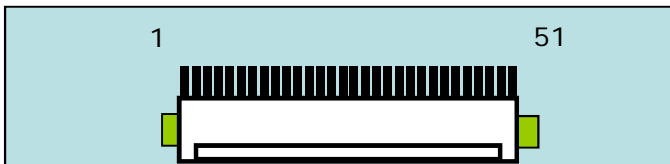
Pin No	Symbol	Description	Pin No	Symbol	Description
1	NC	No Connection	21	GND	Ground
2	NC	No Connection	22	LO[3]-	LVDS Odd Signal 3(-)
3	NC	No Connection	23	LO[3]+	LVDS Odd Signal 3(+)
4	NC	No Connection	24	NC	No Connection
5	NC	No Connection	25	NC	No Connection
6	NC	No Connection	26	GND	Ground
7	SEL_LVDS	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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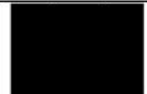




Pin No	Symbol	Description	Pin No	Symbol	Description
41	SCL	SCL for PGMA	47	NC	No Connection
42	SDA	SDA for PGMA	48	VLCD	Power Supply +12V
43	GND	Ground	49	VLCD	Power Supply +12V
44	GND	Ground	50	VLCD	Power Supply +12V
45	GND	Ground	51	VLCD	Power Supply +12V
46	GND	Ground			

Notes : 1. NC(Not Connected) : These pins are only used for BOE internal operations.
2. BIST : Panel will be in "BIST" mode when input DE or input CLOCK quits toggling.

Rear view of LCM



BIST pattern list:

PT1: Black (2 sec)	PT2: White (2 sec)	PT3: Red (2 sec)	PT4: Green (2 sec)	PT5: Blue (2 sec)
				

5.2 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	-	

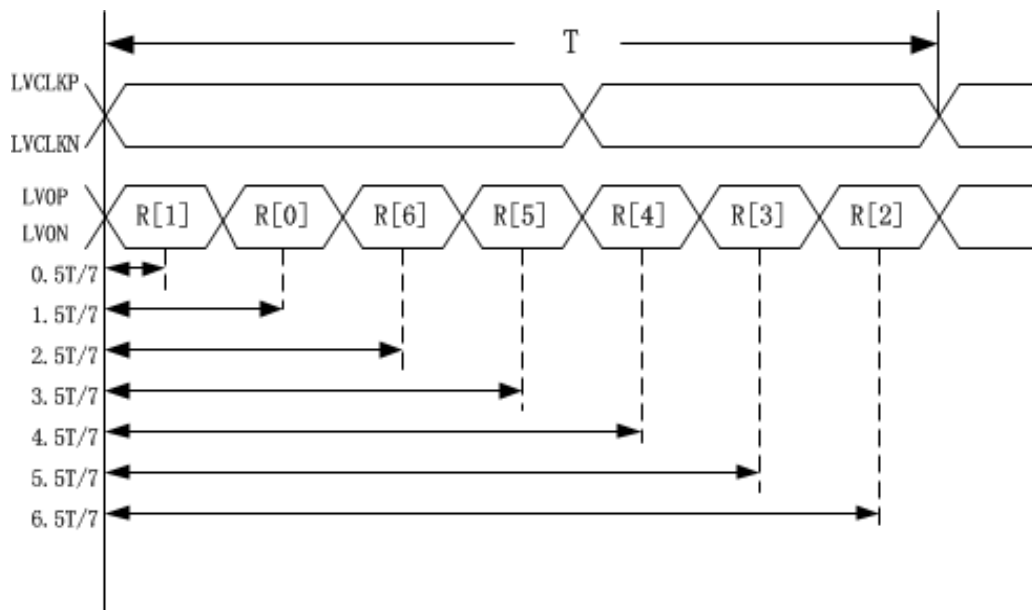
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5.3 LVDS Rx Interface Timing Parameter

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\	



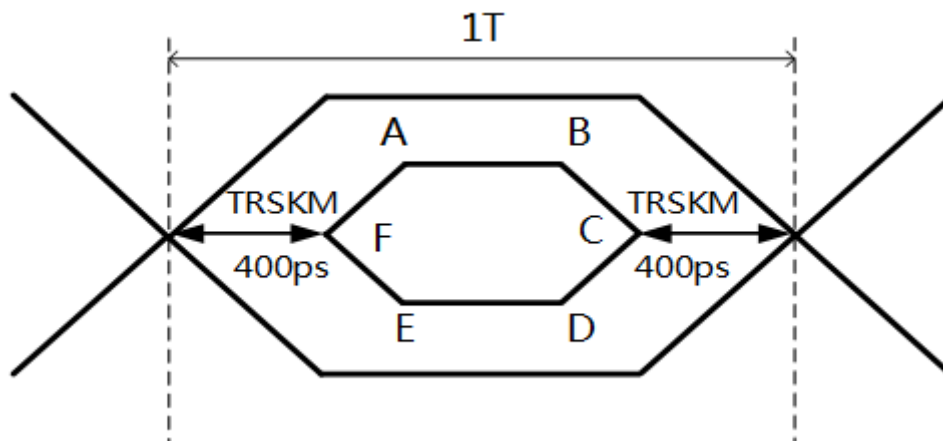
Notes: Input frequency range from 25MHz to 110MHz

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5.4 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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6 SPECIFICATION OF LED DRIVER

6.1 INPUT ELECTRICAL CHARACTERISTICS

LED driver type

Input Electrical Characteristics

NO	Item	Symbol	Min	Type	Max	Unit
1	Input Voltage	Vin	20.8	24	26	V
2	Input Current	Iin		3.75	5	A
3	Input Power	Pin		90	116	W
4	Brightness Voltage	Vadj	0(bright)	---	5 (dark)	V
5	Control Voltage	Enable Von=1.5---5.0V Disable Voff=0---0.5V				

output Electrical Characteristics

Item	Symbol	Test Conditions	Min	Type	Max	Unit
Output Current (per group)	Ioutpg	Vin=24V; Vout=120V; Ta=28°C		720	900	mA
Output Voltage	Vout	Vin=24V; Ta=28°C	60	120	185	V
Efficiency	η	Vin=24V; Vout=120V;		92.5		%
Output otal group	Ggp			1		
The Total Output Current	R			720	900	MA
Output Power	W			86	108	W

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6.2 Pin assignments

Input connector			
Pin No.	Symbol	Description	Parameter
1、 2、 3、 4、 5	+24V	Supply voltage	22~26V
6、 7、 8、 9、 10	GND	Ground	0V
14	ADJ	Dimming control	0V=Brightness Max 5V=Brightness Min
12	N/F	Standby/Operation	On =2--5.0V Off=0-0.5V
13、 11	NC		

Output socket	Pin No.	Symbol	Description	Parameter
CN8	1、 2、 3	OUT+	Output voltage	60-185
	4、 5、 6	OUT-	Ground	0

The above output parameters are determined according to the optical requirement.

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7.0 SIGNAL TIMING SPECIFICATION

7.1 Timing Parameters(DE only mode)

< Table 7. Timing Table >

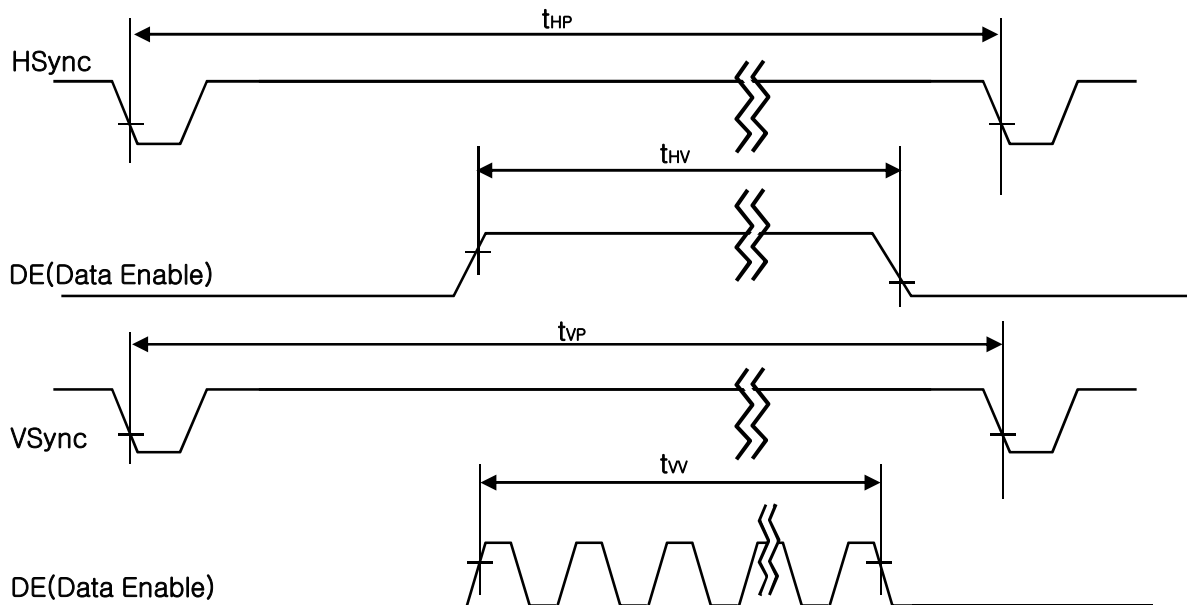
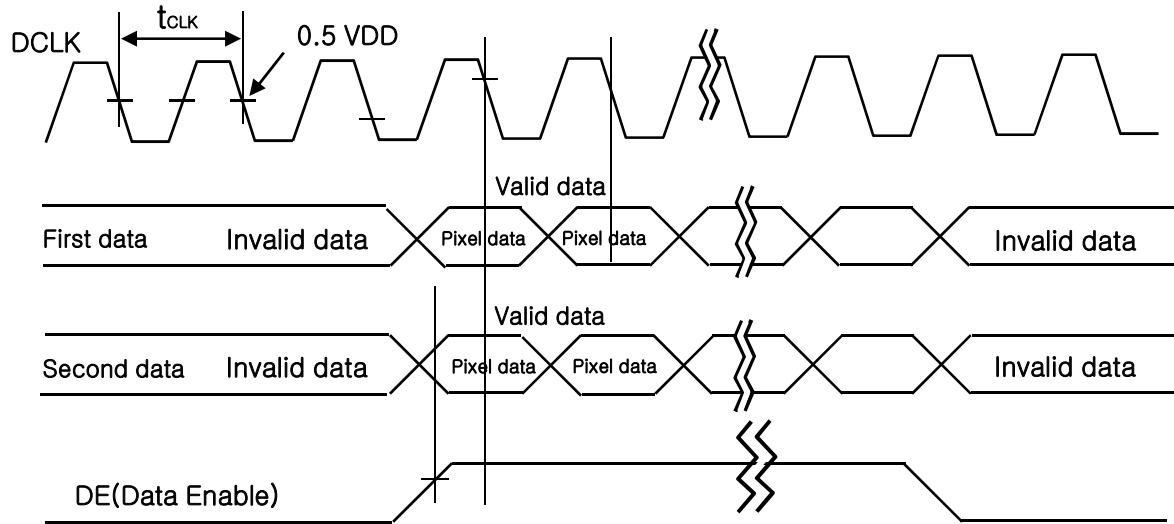
Item		Symbols		Min	Typ	Max	Unit
Clock	Frequency	1/Tc		56.00	74.25	85	MHz
	High Time	Tch		-	4/7Tc	-	
	Low Time	Tcl		-	3/7Tc	-	
Frame Period		Tv		1085	1125	1341	lines
				56.32	60	62.77	Hz
Horizontal Active Display Term		Valid	t _{HV}	-	960	-	t _{CLK}
		Total	t _{HP}	1050	1100	1647	t _{CLK}
Vertical Active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

7.2 Signal Timing Waveform



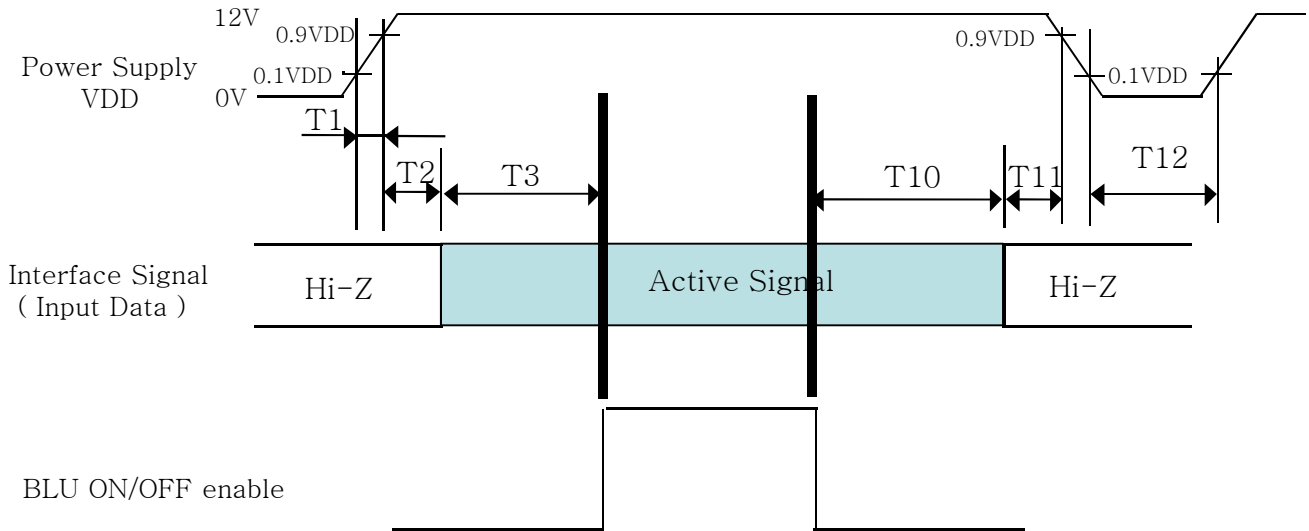
7.3 Input Signals, Basic Display Colors and Gray Scale of Colors

< 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	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	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	
	△	↑						↑						↑											
	▽	↓						↓						↓											
	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	1	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	
	△	↑						↑						↑											
	▽	↓						↓						↓											
	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	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	0	1	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	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

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7.4 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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8.0 MECHANICAL CHARACTERISTICS

8.1 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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9.0 RELIABILITY TEST

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

No	Test Items	Conditions
1	High temperature storage test	Ta = 60 °C, 240 hrs
2	Low temperature storage test	Ta = -20 °C, 240 hrs
3	High temperature & high humidity operation test	Ta = 50 °C, 80%RH, 240 hrs
4	High temperature operation test	Ta = 60 °C, 240 hrs
5	Low temperature operation test	Ta = -5 °C, 240 hrs
6	Thermal shock	Ta = -20 °C ↔ 60 °C (0.5 hr), 100 cycle
7	Vibration test (non-operating)	1.20Grms, 1~200Hz, Random ±Z, +X, +Y per 30min
8	Electro-static discharge test (non-operating)	Air : 150 pF, 330Ω, 15 KV Contact : 150 pF, 330Ω, 8 KV

Note: Before and after Reliability test, LCM should be operated with normal function.

10.0 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.

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(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.

13.0 LABEL

(1) MDL label



序列号标注部分需打印, 说明如下:


1. FG-CODE(前12位)
2. MDL ID 及其条形码

Total Size: 36.5×7mm

Code	Digit												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	S	L	S	5	1	2	3	5	9	0	0	0	0
Description	Model Code /GBN		Grade	Line	Year		Month	Model Extension Code		Serial No 00001-ZZZZZZ			

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(2) High voltage caution label

	HIGH VOLTAGE CAUTION	COLD CATHODE FLUORESCENT LAMP IN LCD PANEL CONTAINS A SMALL AMOUNT OF MERCURY. PLEASE FOLLOW LOCAL ORDINANCES OR REGULATIONS FOR DISPOSAL.
	RISK OF ELECTRIC SHOCK. DISCONNECT THE ELECTRIC POWER BEFORE SERVICING	

(3) Box label

BOE CHONGQING BOE OPTOELECTRONICS TECHNOLOGY Co., LTD

MODEL: DV490FHM-NN0 QTY: 5
 SERIAL NO: K5AW165N00010 DATE: 2016/5/14

BOX ID 条形码



RoHS Compliant

8943

序列号标注部分需打印, 说明如下:

- FG-CODE(前12位) 2. 产品数量
- 3. Box ID 4. 包装日期
- FG-Code后四位

Total Size:100×50mm

Digit	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	S	L	S	5	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 PACKING INFORMATION

11.1 PACKING SPECIFICATIONS

- (1) 5 LCD TV modules / 1 Box
- (2) Box dimensions: 1185(L) x 375(W) x 700(H) mm
- (3) Weight: approximately 62.5Kg (5 modules per box)

11.2 PACKING METHOD

(Figures 11-1 and 11-2 are the packing method)

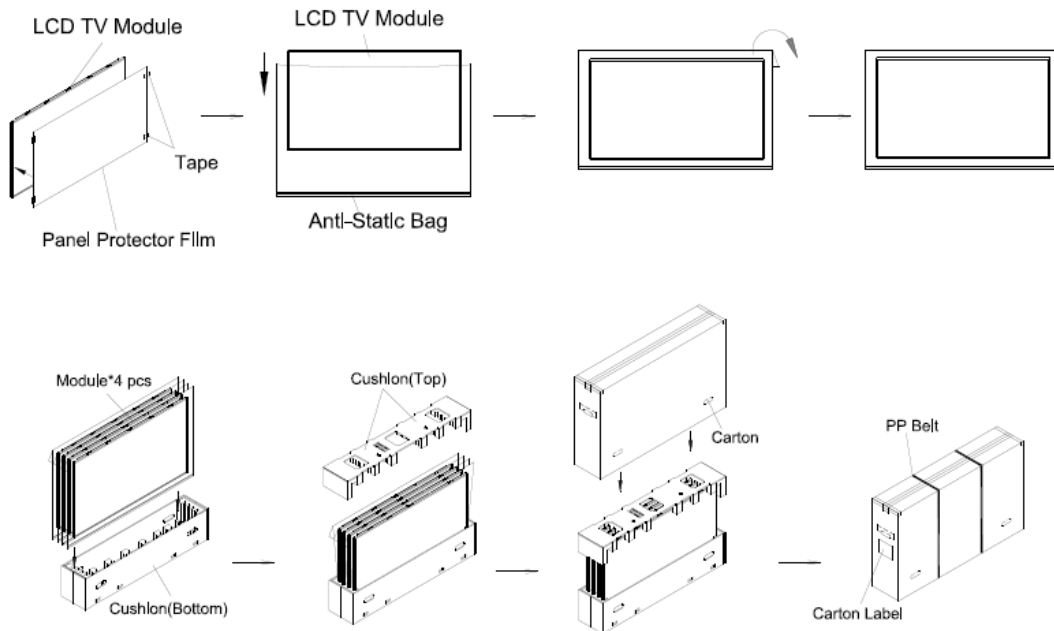


Figure.11-1 packing method

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Sea / Land Transportation
(40ft HQ Container)

Sea / Land Transportation
(40ft Container)

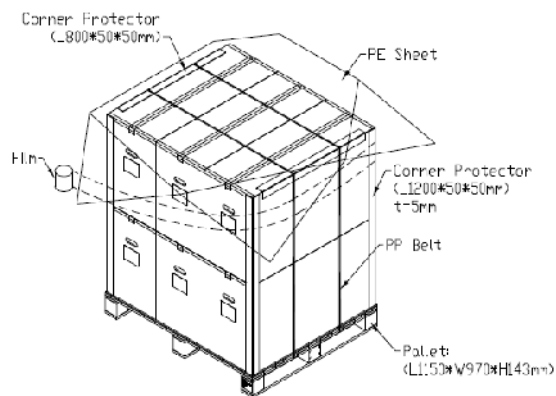
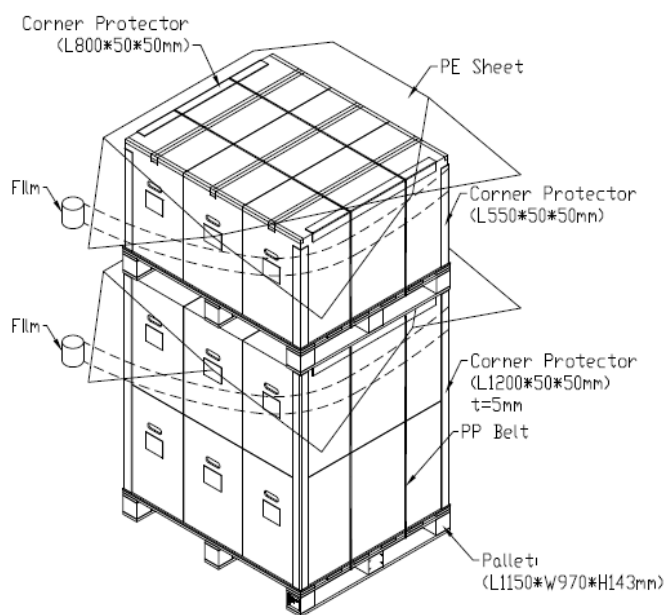


Figure.11-2 packing method

