



# Product Specification

E121GVN-A01

- ☐ Preliminary Specifications  
☒ Final Specifications

Module	12.1" High Brightness TFT-LCD
Model Name	E121GVN-A01
Document Version	Rev.01

Customer

\_\_\_\_\_



Approved by

\_\_\_\_\_

Date

\_\_\_\_\_

Notice: This Specification is subject to change without notice.

Approved By	Prepared By
	



# Product Specification

E121GVN-A01

Revised Record				
Ver	Date	Revised Content/Summary	Page	Remark
01	2018/04/10	Final	All	



# Product Specification

E121GVN-A01

## Contents

1.0	General Descriptions.....	4
2.0	Absolute Maximum Rating.....	6
3.0	Pixel Format Image.....	7
4.0	Optical Characteristics.....	8
5.0	Backlight Characteristics.....	11
6.0	Electrical Characteristics.....	12
7.0	Interface Timings.....	18
8.0	Power Consumption.....	19
9.0	Power ON/OFF Sequence.....	20
10.0	Mechanical Characteristics.....	21



# Product Specification

E121GVN-A01

## 1.0 General Descriptions

### 1.1 Introduction

The E121GVN-A01 is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, a backlight system, column driver and row driver circuit. This TFT LCD has a 12.1-inch diagonally measured active display area with XGA resolution ( 1024 horizontal by 768 vertical) pixels arrays.

### 1.2 Features

- 12.1" TFT LCD Panel
- LED Backlight System
- Supported XGA 1024x768 pixels resolution
- Compatible with RoHS Standard

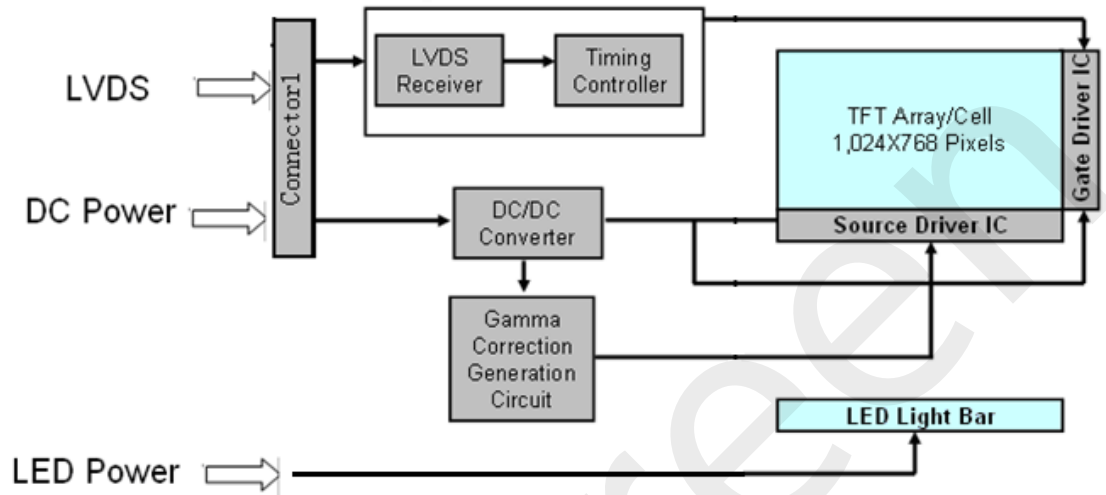
### 1.3 Product Summary

Items	Specifications	Unit
Screen Diagonal	12.1	Inch
Active Area (H x V)	245.76 (H) x184.32 (V)	mm
Number of Pixels (H x V)	1024(RGB) x768	-
Pixel Pitch (H x V)	0.24(H)x0.24 (V)	mm
Pixel Arrangement	R.G.B. Vertical Stripe	-
Display Mode	Normally White	-
White Luminance	1000 ( TYP )	cd /m <sup>2</sup>
Contrast Ratio	800 ( TYP )	-
Response Time	16 ( TYP )	msec
Input Voltage	3.3	V
Power Consumption	10.91 (TYP )	W
Weight	545 (Max )	g
Outline Dimension (H x V x D)	279.0(H) x209.0(V) x9.0(D)	mm
Electrical Interface (Logic)	LVDS	-
Support Color	16.7M	-
Viewing Direction	6 o'clock	-
Surface Treatment	Anti-glare & hardness 3H	-

## 1.4 Functional Block Diagram

Figure 1 shows the functional block diagram of the LCD module.

**Figure 1 Block Diagram**



## 2.0 Absolute Maximum Ratings

Table 1 Absolute Ratings of Environment

Item	Symbol	Min.	Max.	Unit	Conditions
Supply Voltage	V <sub>DD</sub>	-0.5	5	V	(1)
Operating Temperature	TOP	-20	70	°C	(1) (2) (3) (4)
Operating Humidity	HOP	10	85	%RH	-
Storage Temperature	TST	-30	80	°C	-
Storage Humidity	HST	10	95	%RH	-

Note (1): Humidity: 85%RH Max. (T≤40°C) Note static electricity.

Maximum wet bulb temperature at 39°C or less. (T>40°C) No condensation.

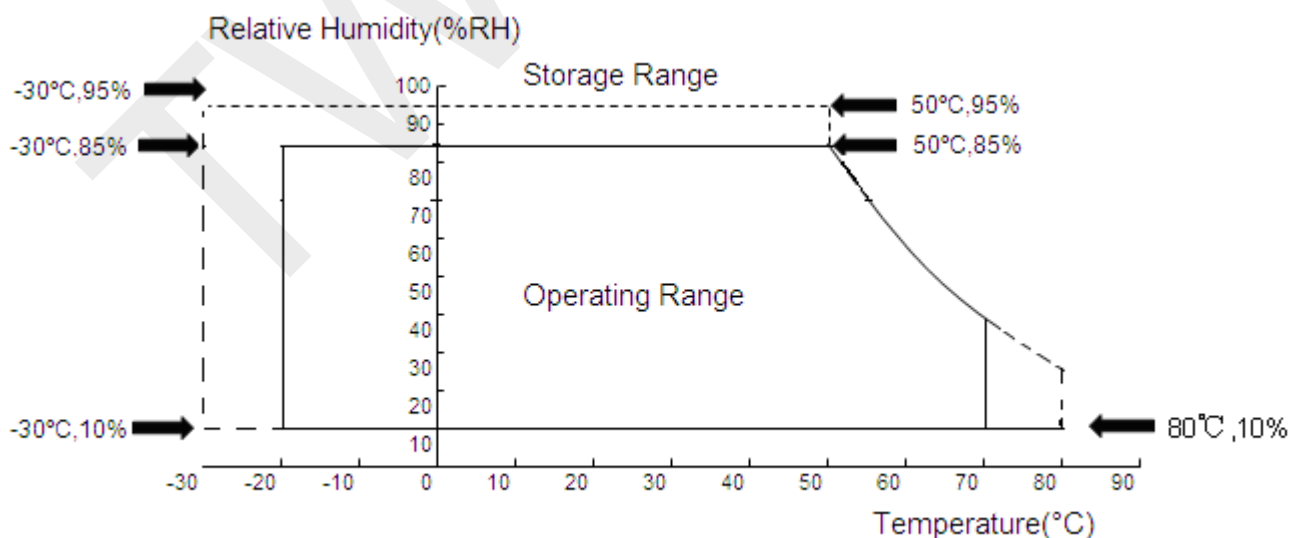
Note (2): There is a possibility of causing deterioration in the irregularity and others of the screen and the display fineness though the liquid crystal module doesn't arrive at destruction when using it at 80~85°C or -20°C.

Note (3): There is a possibility of causing the fineness deterioration by the prolonged use in the (high temperature) humidity environment (60% or more).

Note (4): In the operating temperature item, the low temperature side is the ambient temperature regulations. The high temperature side is the panel surface temperature regulations.

Note (5): Storage Range&Operating Range Picture:

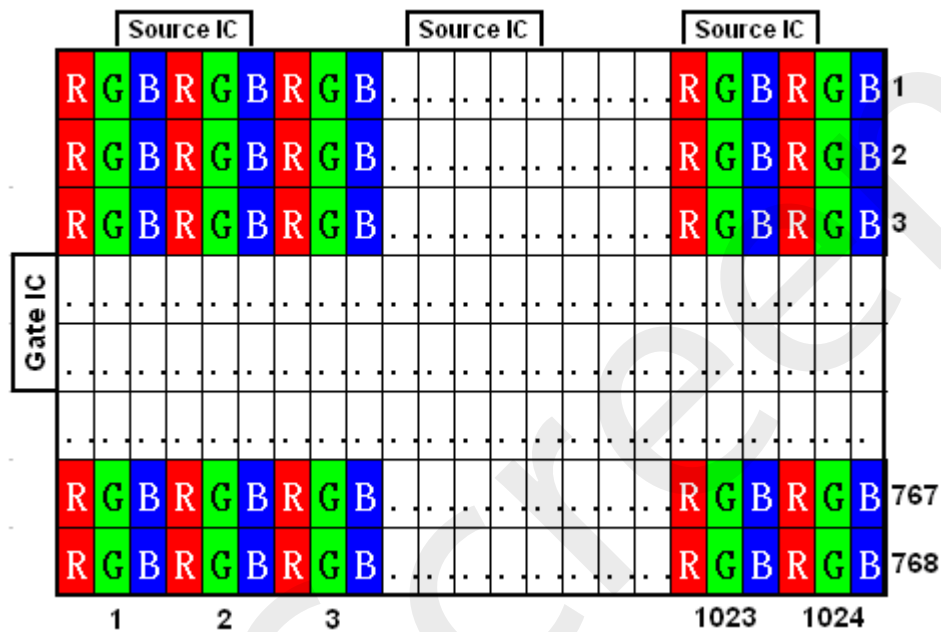
Figure 2 Temperature& Humidity Curve



## 3.0 Pixel Format Image

Figure 3 shows the relationship of the input signals and LCD pixel format image.

Figure 3 Pixel Format



R+G+B dots=1 pixel

## 4.0 Optical Characteristics

The optical characteristics are measured under stable conditions as following notes.

Table 2 Optical Characteristics

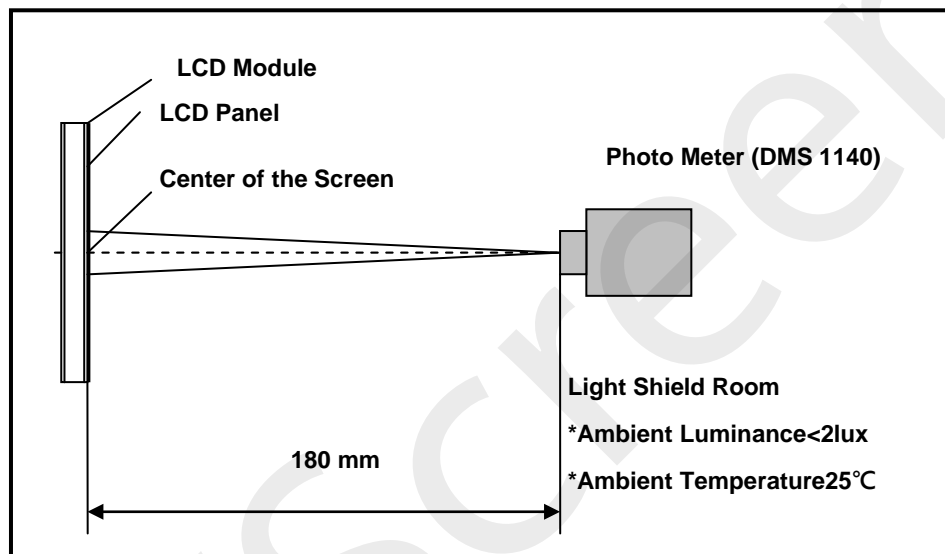
Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR>10)	Horizontal	$\theta_{x+}$	70	80	-	degree	(1),(2),(3)
		$\theta_{x-}$	70	80	-		
	Vertical	$\theta_{y+}$	70	80	-		
		$\theta_{y-}$	70	80	-		
Contrast Ratio	Center		720	800	-	-	(1),(2),(4)
Response Time	Rising + Falling		-	16	19	ms	(1),(2),(5)
Color Chromaticity (CIE1931)	White	x	0.255	0.305	0.355	-	(1),(2)
	White	y	0.275	0.325	0.375	-	
	Red	x	0.614	0.644	0.674	-	
	Red	y	0.314	0.344	0.374	-	
	Green	x	0.280	0.310	0.340	-	
	Green	y	0.604	0.634	0.664	-	
	Blue	x	0.122	0.152	0.182	-	
	Blue	y	0.051	0.081	0.111	-	
NTSC			-	70	-	-	
White Luminance	Central Points		900	1000	-	cd/m <sup>2</sup>	(1),(2),
Luminance Uniformity	9 Points		75	80	-	%	(1),(2),(6)



## Note (1) Measurement Setup:

The LCD module should be stabilized at given ambient temperature(25°C) for 30 minutes to avoid abrupt temperature changing during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 30 minutes in the windless room.

Figure 4 Measurement Setup



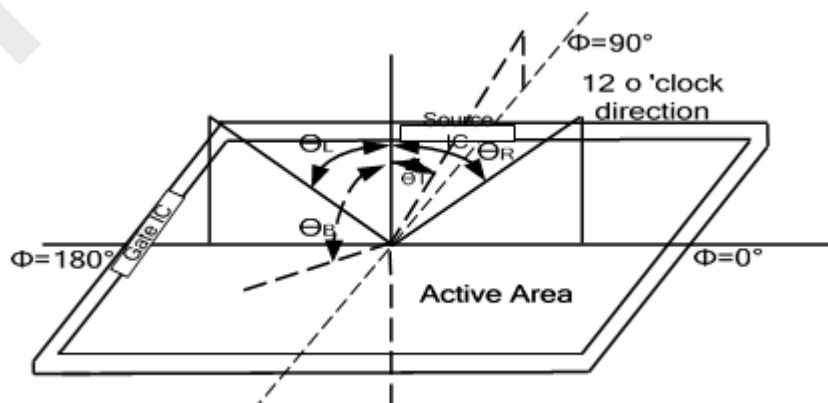
## Note (2) The LED input parameter setting as:

I\_LED: 420mA

PWM\_LED: Duty 100 %

## Note (3) Definition of Viewing Angle

Figure 5 Definition of Viewing Angle



## Note (4) Definition Of Contrast Ratio (CR)

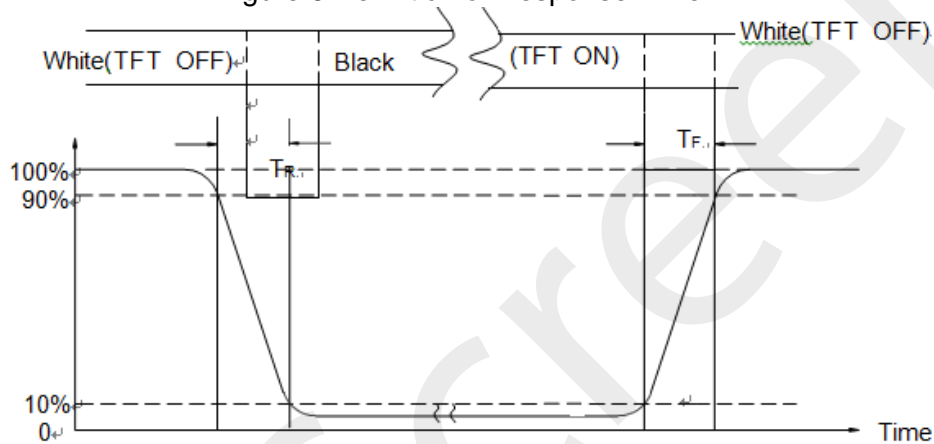
The contrast ratio can be calculated by the following expression

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

L255: Luminance of gray level L255, L0: Luminance of gray level 0

## Note (5) Definition of Response Time ( $T_R$ , $T_F$ )

Figure 6 Definition of Response Time



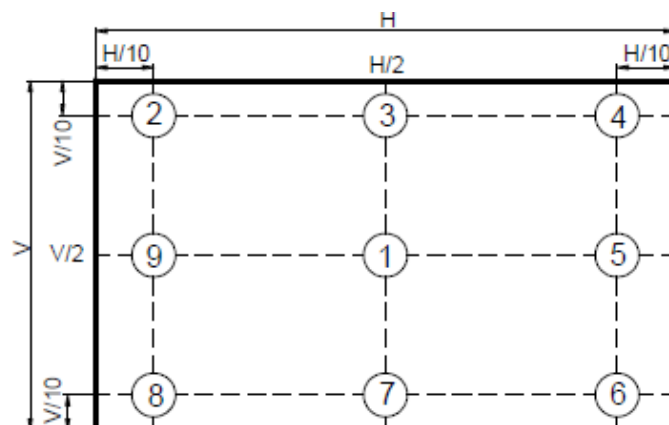
## Note (6) Definition of Luminance Uniformity (Ref.: Active Area)

Measure the luminance of gray level 255 at 9 points.

$$\text{UNF(9pts)} = \frac{\text{Min}(L1, L2, L9)}{\text{Max}(L1, L2, L9)}$$

H—Active Area Width, V—Active Area Height, L—Luminance

Figure 7 Measurement Locations of 9 Points



## 5.0 Backlight Characteristics

### 5.1 Parameter Guideline Of LED Backlight

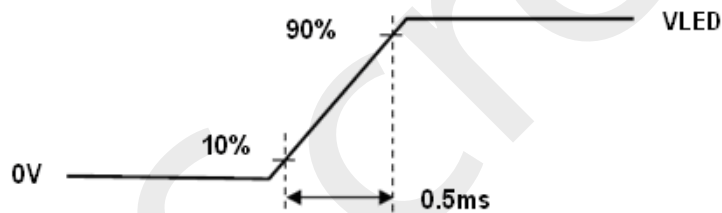
Table 3 Parameter Guideline for LED Backlight

Item	Symbol	Min.	Typ.	Max.	Units	Conditon
Voltage of LED Backlight	$V_F$		24		V	
Curnnet of LED Backlight	$I_F$		420		m A	
Backlight PowerConsumption	$P_L$		10.08		W	
LED Life Time	-	50,000	-	-	Hours	Ta=25°C/I <sub>L</sub> =420mA Note (1)

Note (1) The LED life time define as the estimated time to 50% degradation of initial luminous.

Note (2) Operating temperature 25°C, humidity 55%RH.

Figure 8 LED Rush Current Measure Condition





# Product Specification

E121GVN-A01

## 6.0 Electrical Characteristics

### 6.1 Interface Connector

Table 4 Connector Name / Designation

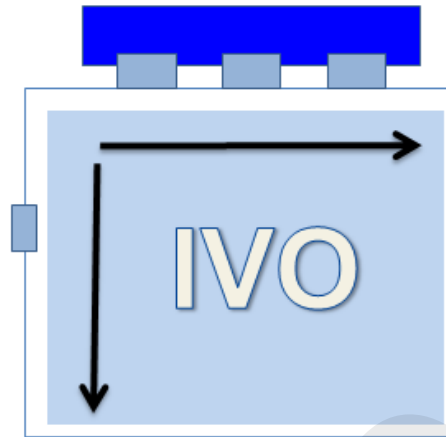
Item	Description
FPC Down Connector ( 20pin pitch=1.25mm )	PCB Jack Connector recommended model: MSB240420HE Manufactured by STM
	PIN IDE Connector model: P240420H

Table 5 Signal Pin Assignment

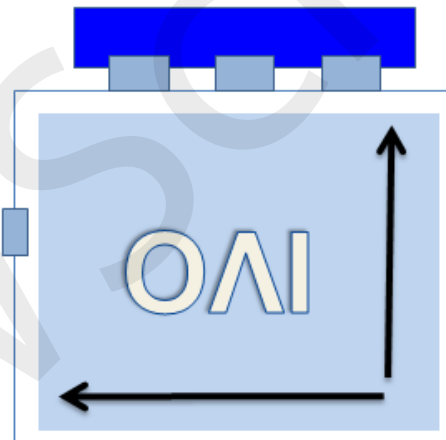
Pin #	Symbol	Description
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	VSS	Ground
4	REV	Reverse Scan selection {High:2.5(min), 3.3(typ),3.6(max); Low: 0.5(max)}
5	Rin1-	-LVDS differential data input (R0-R5,G0)
6	Rin1+	+LVDS differential data input (R0-R5,G0)
7	VSS	Ground
8	Rin2-	-LVDS differential data input (G1-G5,B0-B1)
9	Rin2+	+LVDS differential data input (G1-G5,B0-B1)
10	VSS	Ground
11	Rin3-	-LVDS differential data input (B2-B5,HS,VS,DE)
12	Rin3+	+LVDS differential data input (B2-B5,HS,VS,DE)
13	VSS	Ground
14	ClkIN-	-LVDS differential clock input
15	ClkIN+	+LVDS differential clock input
16	GND	Ground
17	Rin4-	-LVDS differential data input (R6-R7,G6-G7,B6-B7)
18	Rin4+	+LVDS differential data input (R6-R7,G6-G7,B6-B7)
19	SEL68	6/8 bits LVDS data input selection(H:8bit L/NC:6bit)
20	Bist	Internal use

Note(1) : All input signals shall be low or Hi-resistance state when VDD is off.

Note (2) REV = LOW/NC



Note (3) REV = High



## 6.2 LVDS Receiver

### 6.2.1 Signal Electrical Characteristics For LVDS Receiver

The built-in LVDS receiver is compatible with (ANSI/TIA/TIA-644 ) standard.

Table 6 LVDS Receiver Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	V <sub>th</sub>	-	-	+100	mV	V <sub>CM</sub> =+1.2V
Differential Input Low Threshold	V <sub>tl</sub>	-100	-	-	mV	V <sub>CM</sub> =+1.2V
Magnitude Differential Input Voltage	V <sub>ID</sub>	100	-	600	mV	-
Common Mode Voltage	V <sub>CM</sub>	V <sub>ID</sub>  /2+0.6	1.2	1.8- V <sub>ID</sub>  /2	V	-
Common Mode Voltage Offset	ΔV <sub>CM</sub>	-	-	50	mV	V <sub>CM</sub> =+1.2V

- Note: (1) Input signals shall be low or Hi- resistance state when VDD is off.  
(2) All electrical characteristics for LVDS signal are defined and shall be measured at the interface connector of LCD.

Figure 9 Voltage Definitions

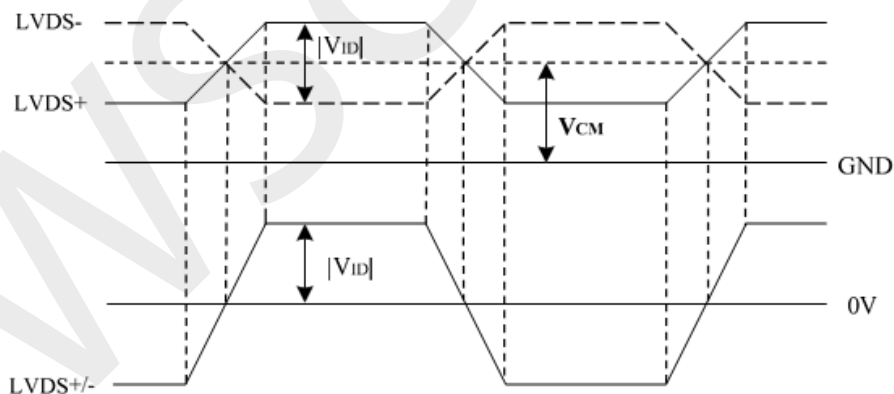


Figure 10 Measurement System

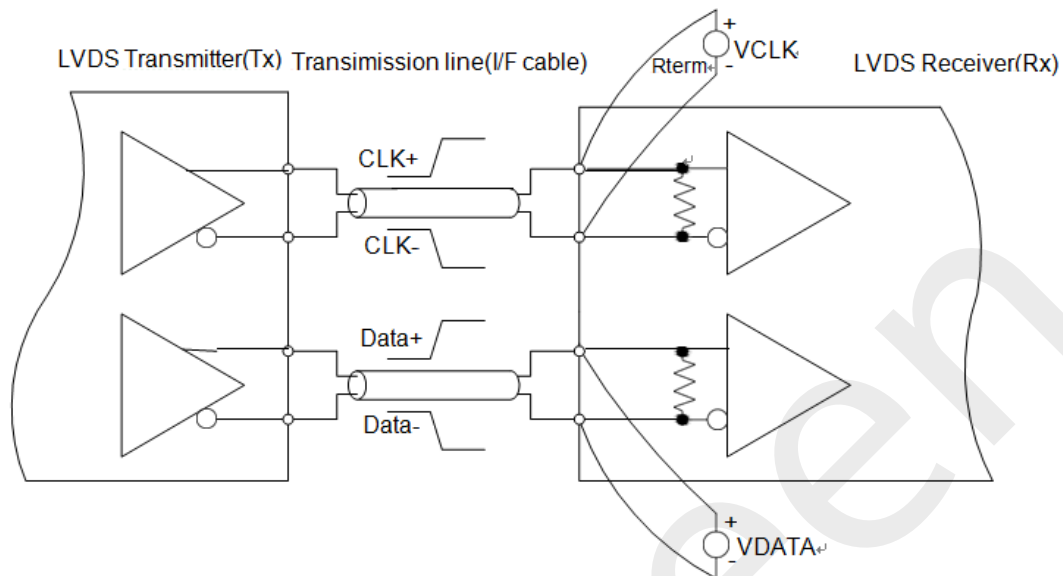


Figure 11 Data Mapping (8 Bit)

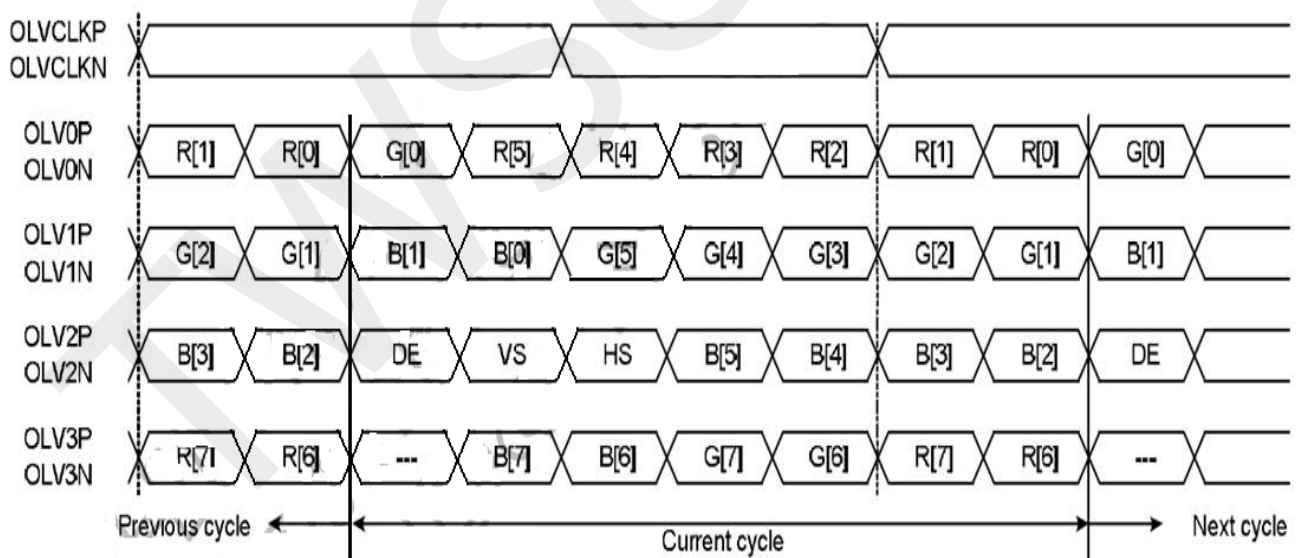
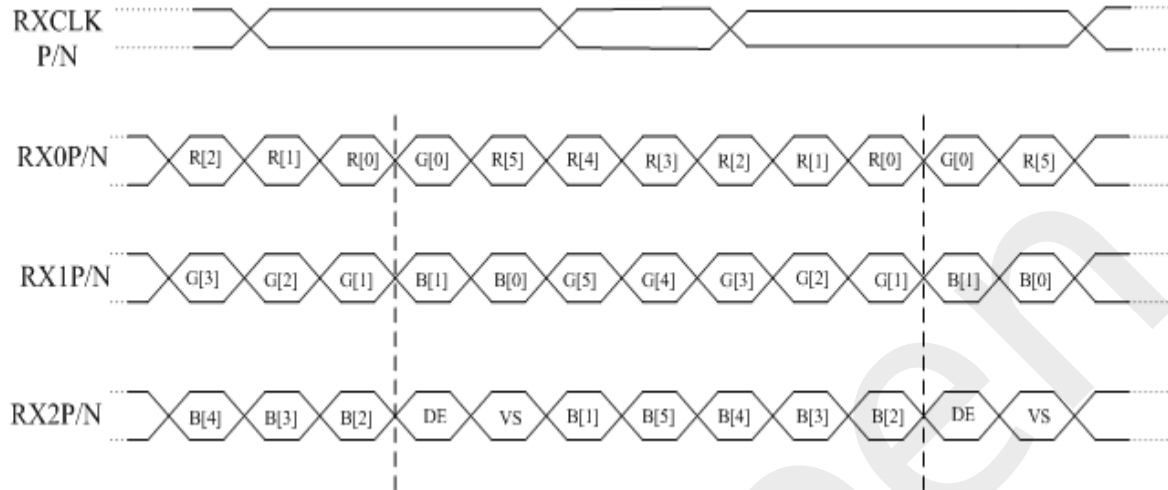




Figure 12 Data Mapping (6 Bit)

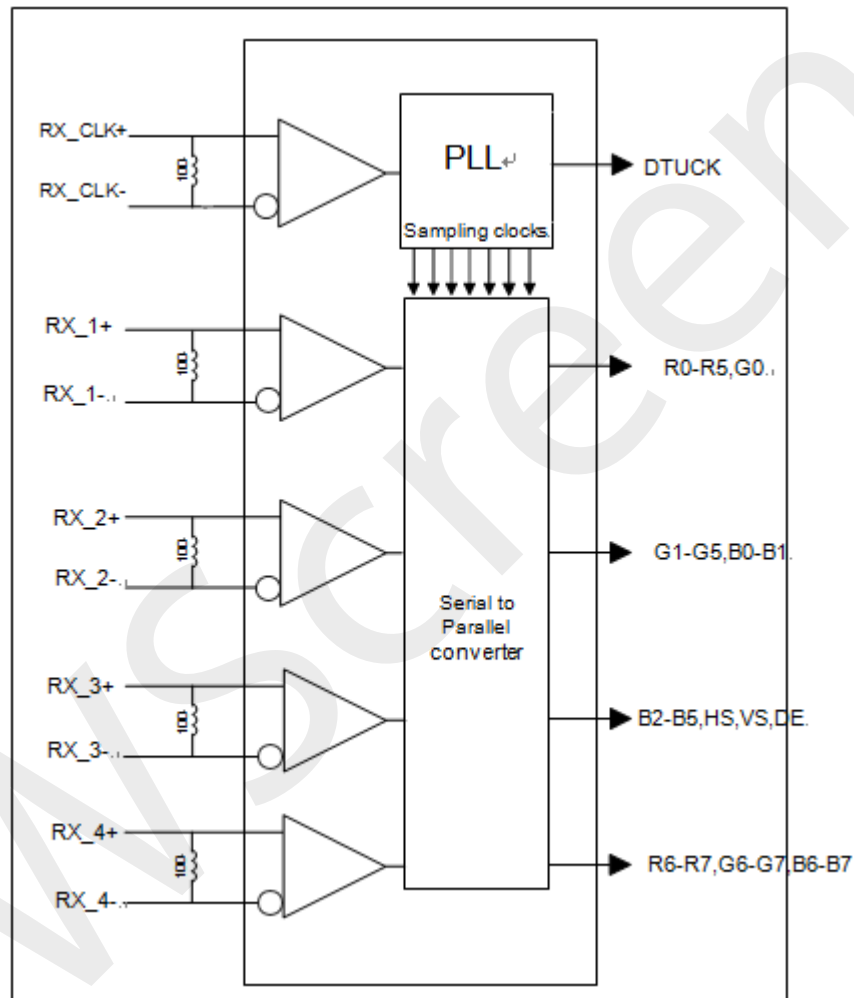




## 6.2.2 LVDS Receiver Internal Circuit

Figure 13 LVDS Receiver Internal Circuit shows the internal block diagram of the LVDS receiver. This LCD module equips termination resistors for LVDS link.

Figure 13 LVDS Receiver Internal Circuit



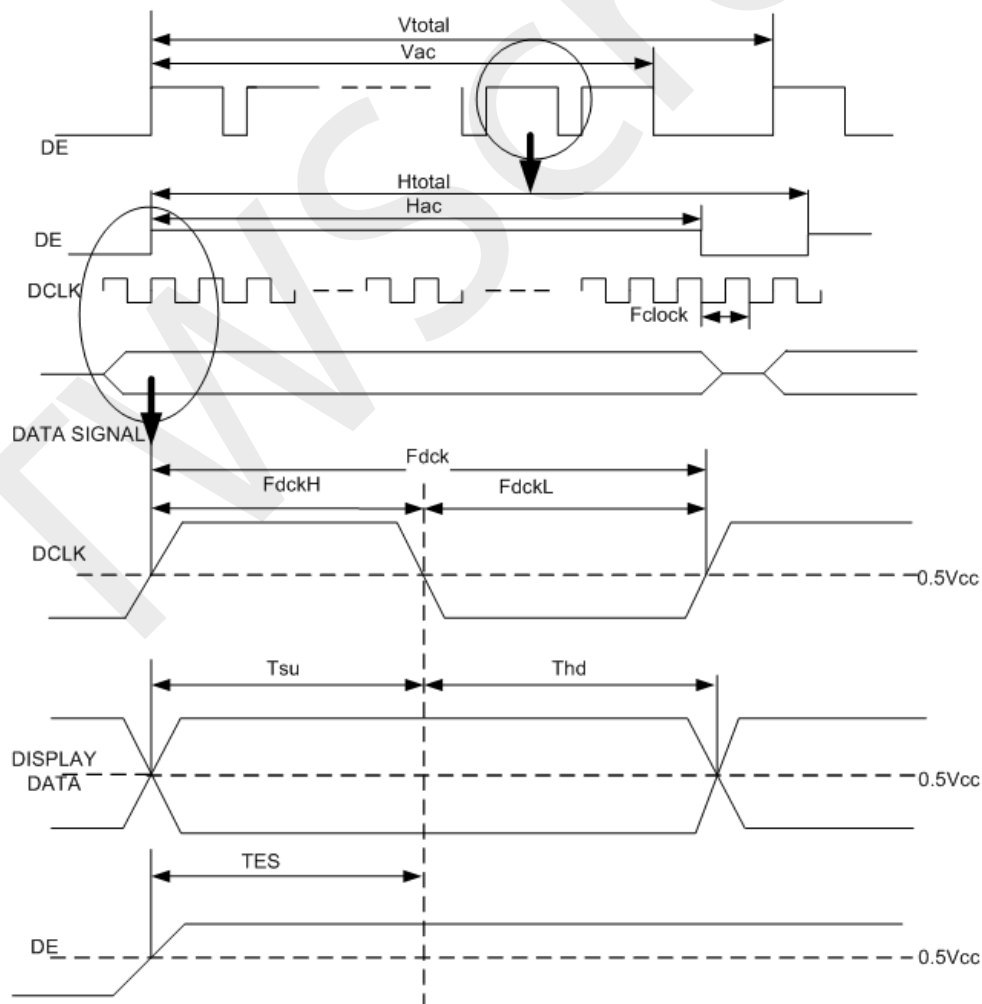
## 7.0 Interface Timings

Table 7 Interface Timings

Parameter	Symbol	Unit	Min.	Typ.	Max.
LVDS Clock Frequency	Fclk	MHz	50	65	80
H Total Time	HT	Clocks	1100	1344	2047
H Active Time	HA	Clocks	1024	1024	1024
H Blanking Time	HBL	Clocks	76	320	1023
V Total Time	VT	Lines	776	806	1023
V Active Time	VA	Lines	768	768	768
V Blanking Time	VBL	Lines	8	38	255
Frame Rate	Vsync	Hz	55	60	65

Note: H Blanking Time and V Blanking Time can not be changed at every frame

Figure 14 Timing Characteristics



## 8.0 Power Consumption

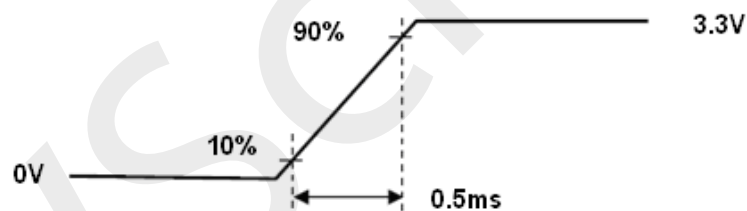
Input power voltage specifications are as follows.

Table 8 Power Voltage

Item	Symbol	Min.	Typ.	Max.	Units	Note
LCD Drive Voltage (Logic)	VDD	3.0	3.3	3.6	V	(2), (4)
VDD Current	IDD	-	-	250	mA	(3),(4),(6)
VDD Power Consumption	PDD	-	-	0.825	W	
Rush Current	Irush	-	-	3	A	(1),(4),(5)
Allowable Logic/LCD Drive Ripple Voltage	VDDrp	-	-	200	mV	(4)

Note (1) Measure Condition

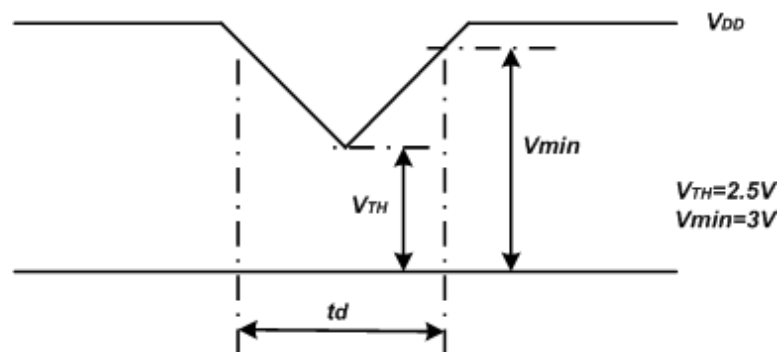
Figure 15 VDD Rising Time



Note (2) VDD Power Dip Condition

If  $V_{TH} < VDD \leq V_{min}$ , then  $t_d \leq 10ms$ ; When the voltage returns to normal our panel must revive automatically.

Figure 16 VDD Power Dip



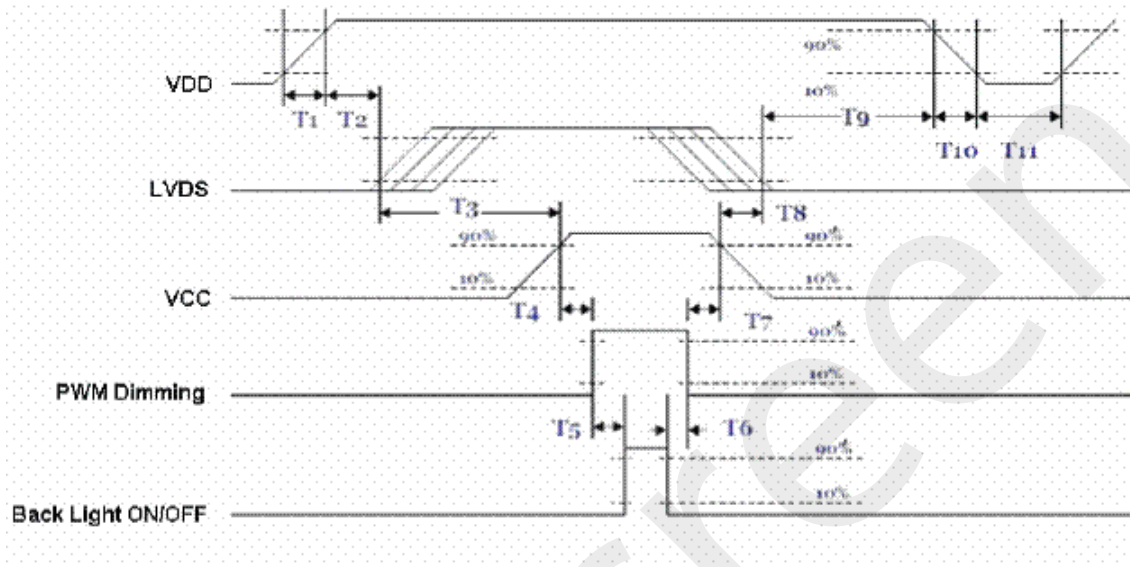
Note (3) Frame Rate=60Hz, VDD=3.3V,DC Current.

Note (4) Operating temperature 25°C, humidity 55%RH

## 9.0 Power ON/OFF Sequence

Power on/off sequence is as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi-resistance state or low level when VDD is off.

Figure 17 Power Sequence



Power ON/OFF sequence timing

Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0.5	-	10	[ms]
T2	30	40	50	[ms]
T3	200	-	-	[ms]
T4	10	-	-	[ms]
T5	10	-	-	[ms]
T6	0	-	-	[ms]
T7	10	-	-	[ms]
T8	100	-	-	[ms]
T9	0	16	50	[ms]
T10	-	-	10	[ms]
T11	1000	-	-	[ms]

Note (1) Power On Sequence: VCC-> AVDD -> VGL -> VGH -> Data -> B/L

(2) Power Off Sequence: B/L-> Data -> VGH -> VGL -> AVDD -> VCC

### 10.0 Mechanical Characteristics

#### 10.1 Outline Drawing

Figure 18 Outline Drawing (Front Side)

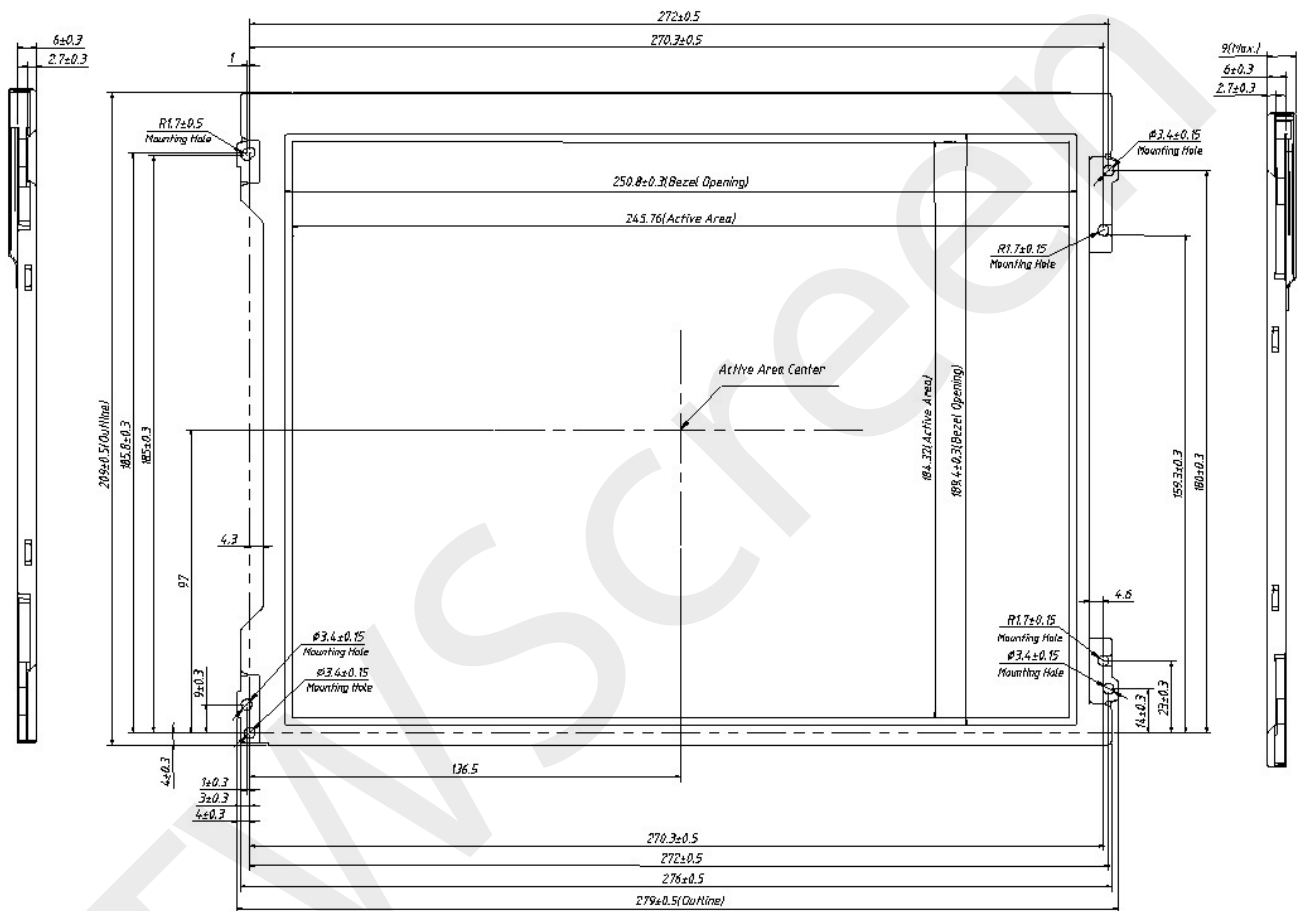
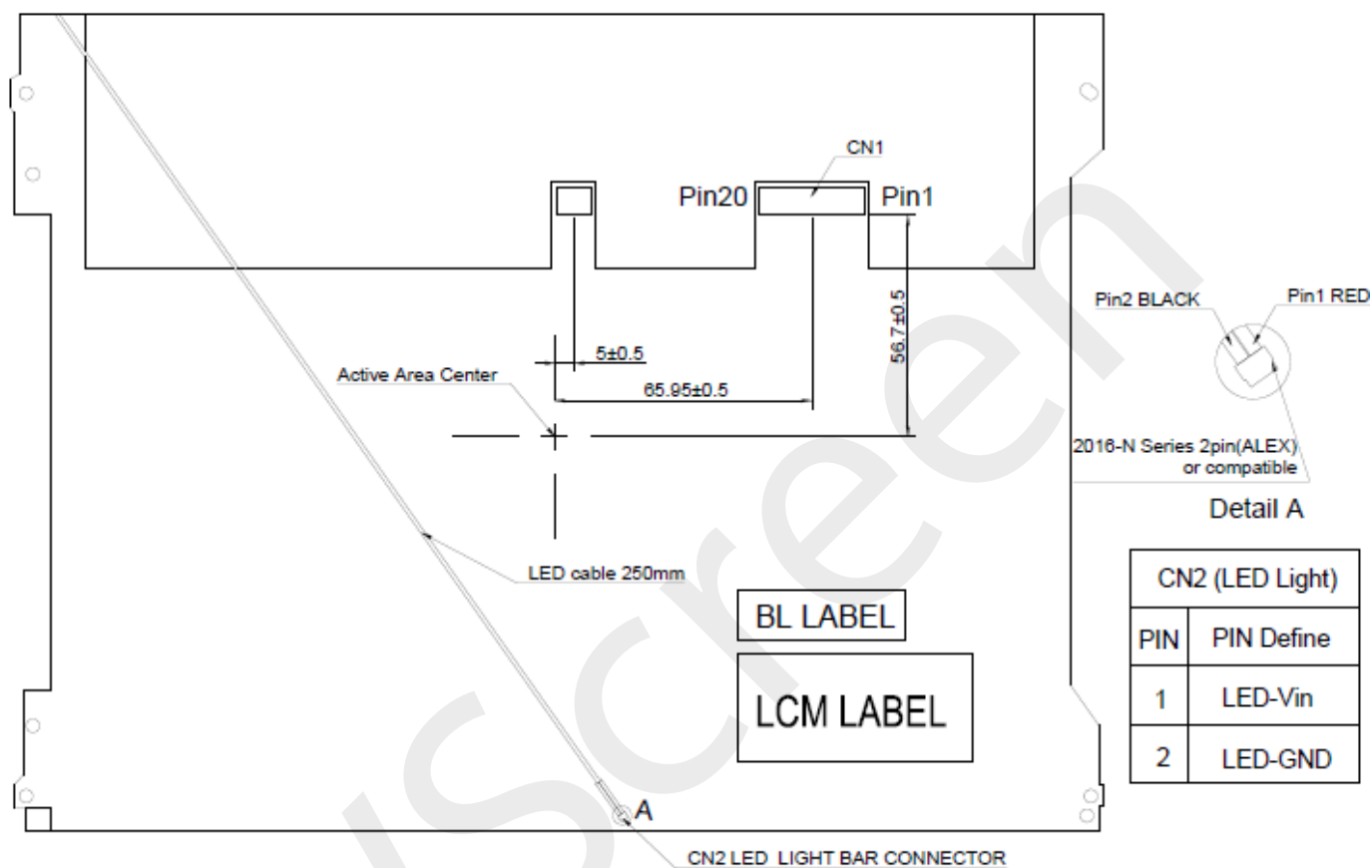


Figure 19 Outline Drawing (Rear Side)



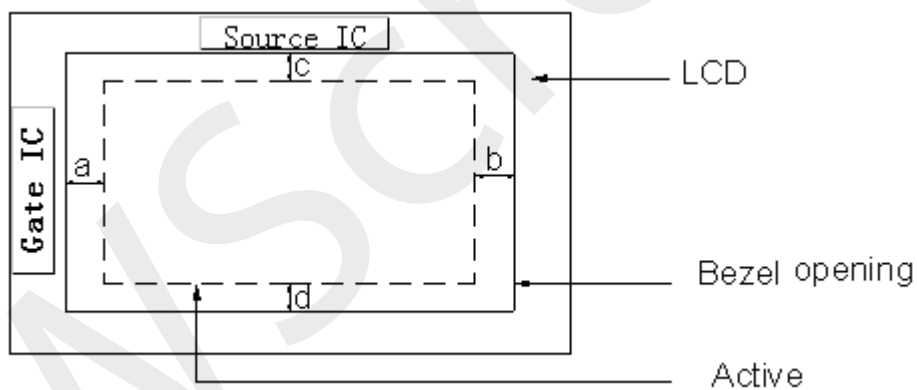
Note (1) Unnoted tolerance :  $\pm 0.5\text{mm}$ .

## 10.2 Dimension Specifications

Table 9 Module Dimension Specifications

Item	Min.	Typ.	Max.	Unit
Width	275.5	276	276.5	mm
Height	208.5	209	209.5	mm
Thickness ( with PCBA )	5.7(without PCBA)	6(without PCBA)	6.3(without PCBA)	mm
Weight	-	518.7	545	g
BM:   a-b   &   c-d	≤1.0			mm

Figure 20 BM Area





# Product Specification

DB-LD0C-07

☐ Preliminary Specifications

☒ Final Specifications

Product	LED Driver Board
Model Name	DB-LB0C-07
Document Version	Rev.01

Customer

\_\_\_\_\_



Approved by

Date

\_\_\_\_\_

\_\_\_\_\_

Notice: This Specification is subject to change without notice.

Approved By	Prepared By
	





# Product Specification

DB-LD0C-07

## Contents

1. General Description .....	4
2. Feature .....	4
3. Protection .....	5
4. Optional Backlight Driving Condition .....	5
5. Absolute maximum ratings.....	5
6. Interface Characteristics .....	6
7. Environmental .....	6
8. Connector Socket.....	7
8.1 Connector Type .....	7
8.2 Pin Definition.....	8
9. Mechanical Characteristics .....	9



# Product Specification

DB-LD0C-07

Revised Record				
Version	Date	Revised Content/Summary	Page	Remark
01	2018/04/10	First Edition	All	

## 1. General Description

This Product Specification is made to be the standard of Elite manufactured LED Driving Board such a standard will be followed in Taiwan Screen production, shipment, and quality inspection.



## 2. Feature

- 30W LED Driver
- Constant-Current Control
- Support PWM Dimming

## 3. Protection

Item	Max.	Remark
Over current protection (OCP)	Depending on LED B/L	
Over voltage protection (OVP)	56V(Note1)	

**Note :** When the LED string is opened, over voltage protection will limit the output to approximately 56V

## 4. Optional Backlight Driving Condition

Item	Symbol	Min.	TYP.	Max.	Unit	Remark
LED Voltage	$V_{LED}$		24		V	
LED Current	$I_{LED}$		420		mA	

## 5. Absolute maximum ratings

Parameter	Symbol	Min.	TYP	Max.	Unit	Remark
Input Voltage	$V_{in}$	10.8	12	15	V	
Output Voltage	$V_{out}$			50	V	
Output Current	$I_{out}$			1000	mA	

## 6. Interface Characteristics

Parameter	Symbol	Min.	TYP.	Max.	Unit	Remark
Backlight ON Voltage	INVON	1.25	5	V <sub>in</sub>	V	
Backlight OFF Voltage	INVON			0.4	V	
PWM Control	PWM	3.3	5		V	
PWM Control Frequency	PWM	85	100		Hz	
PWM Control Duty	PWM	0		100	%	

## 7. Environmental

Item	Symbol	Conditions	MIN	MAX	Unit	Remark
Operating Temperature	T <sub>op</sub>	Ha=90%RH	0	60	°C	
Storage Temperature	T <sub>stg</sub>	Ha=95%RH	-20	85	°C	

## 8. Connector Socket

### 8.1 Connector Type

Connector (J1)

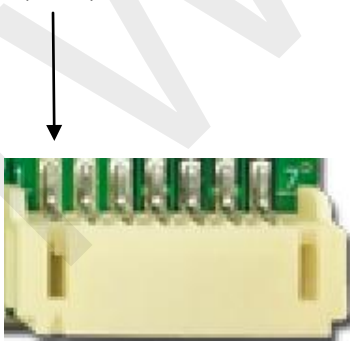
Connector Name / Designation	For Signal Connector
Manufacturer	JST or compatible
Type / Part Number	S7B-PH-SM4-TB or compatible
Mating Housing / Part Number	PHR-7 or compatible

Connector (J2 & J3)

Connector Name / Designation	For Signal Connector
Manufacturer	JST or compatible
Type / Part Number	S2B-PH-SM4-TB or compatible
Mating Housing / Part Number	PHR-2 or compatible

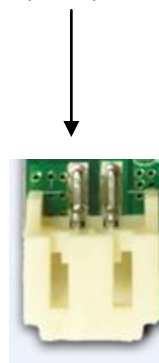
J1 S7B-PH-SM4-TB

(Pin 1)



J2 & J3 S2B-PH-SM4-TB

(Pin 1)





# Product Specification

DB-LD0C-07

## 8.2 Pin Definition

Connector (J1)

PIN No.	Symbol	Description
1	Vin	Power Input (+12V)
2	Vin	Power Input (+12V)
3	Vin	Power Input (+12V)
4	GND	Ground
5	PWM	PWM Brightness Control
6	GND	Ground
7	EN	Backlight on/off Control (5V / 0V)

Connector (J2 & J3)

PIN No.	Symbol	Description
1	V_LED+	LED Power +
2	V_LED-	LED Power -

## 9. Mechanical Characteristics

Dimension: 75(L) \*30(W) \*8.5(H) mm

Weight: MAX. 20g

