

Doc. Number:

Tentative Specification  
Preliminary Specification  
Approval Specification

# MODEL NO.: N116BGE

## SUFFIX: L32

<b>Customer: Common Model</b>	
<b>APPROVED BY</b>	<b>SIGNATURE</b>
<u>Name / Title</u>	_____
Note	
Please return 1 copy for your confirmation with your signature and comments.	

Approved By	Checked By	Prepared By
方健穎	甘政原	蔡百琪
2011-12-14 16:18:23 CST	2011-12-08 13:33:19 CST	2011-12-06 11:59:27 CST

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REVISION HISTORY

Version	Date	Page	Description
0.0	Jun.28 2011	All	Spec Ver.0.0 was first issued.
0.1	Aug.16 2011	All	1.2 GENERAL SPECIFICATI0NS_Power Consumption
			4.3.1 LCD ELETRONICS SPECIFICATION_Power Supply Current
			4.5 DISPLAY TIMING SPECIFICATIONS_Vertical Total Time
			5.2 OPTICAL SPECIFICATIONS

## 1. GENERAL DESCRIPTION

### 1.1 OVERVIEW

N116BGE-L32 is a 11.6" (11.6" diagonal) TFT Liquid Crystal Display module with LED Backlight unit and 40 pins LVDS interface. This module supports 1366 x 768 HD mode and can display 262,144 colors. The optimum viewing angle is at 6 o'clock direction.

### 1.2 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Screen Size	11.6 diagonal		
Driver Element	a-si TFT active matrix	-	-
Pixel Number	1366 x R.G.B. x 768	pixel	-
Pixel Pitch	0.1875 (H) x 0.1875 (V)	mm	-
Pixel Arrangement	RGB vertical stripe	-	-
Display Colors	262,144	color	-
Transmissive Mode	Normally white	-	-
Surface Treatment	Hard coating (3H), Anti-Glare	-	-
Luminance, White	200(typ.)	Cd/m2	
Power Consumption	Total (2.552 W) (Max.) @ cell (0.74 W) (Max.), BL 1.812 W (Max.)		(1)

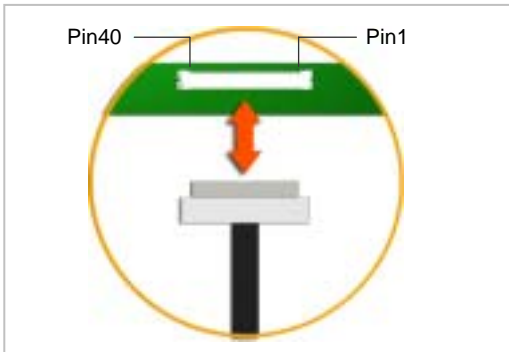
Note (1) The specified power consumption (with converter efficiency) is under the conditions at VCCS = 3.3 V, fv = 60 Hz, LED\_VCCS = Typ, fPWM = 200 Hz, Duty=100% and Ta = 25 ± 2 °C, whereas mosaic pattern is display.

## 2. MECHANICAL SPECIFICATIONS

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H) With Bracket	277.5	278	278.5	mm	(1)
	Horizontal (H) W/o Bracket	267.5	268	268.5	mm	
	Vertical (V) With PCB	167.3	168	168.7	mm	
	Vertical (V) W/o PCB	157	157.5	158	mm	
	Thickness (T)	-	-	3.4	mm	
Bezel Area	Horizontal	258.825	259.125	259.425	mm	
	Vertical	146.5	146.8	147.1	mm	
Active Area	Horizontal	-	256.125	-	mm	
	Vertical	-	144	-	mm	
Weight		-	205	215	g	

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

## 2.1 CONNECTOR TYPE



Please refer Appendix Outline Drawing for detail design.

Connector Part No.: IPEX-20455-040E-12, or equivalent

User's connector Part No: IPEX-20453-040T-01 or equivalent

## 3. ABSOLUTE MAXIMUM RATINGS

### 3.1 ABSOLUTE RATINGS OF ENVIRONMENT

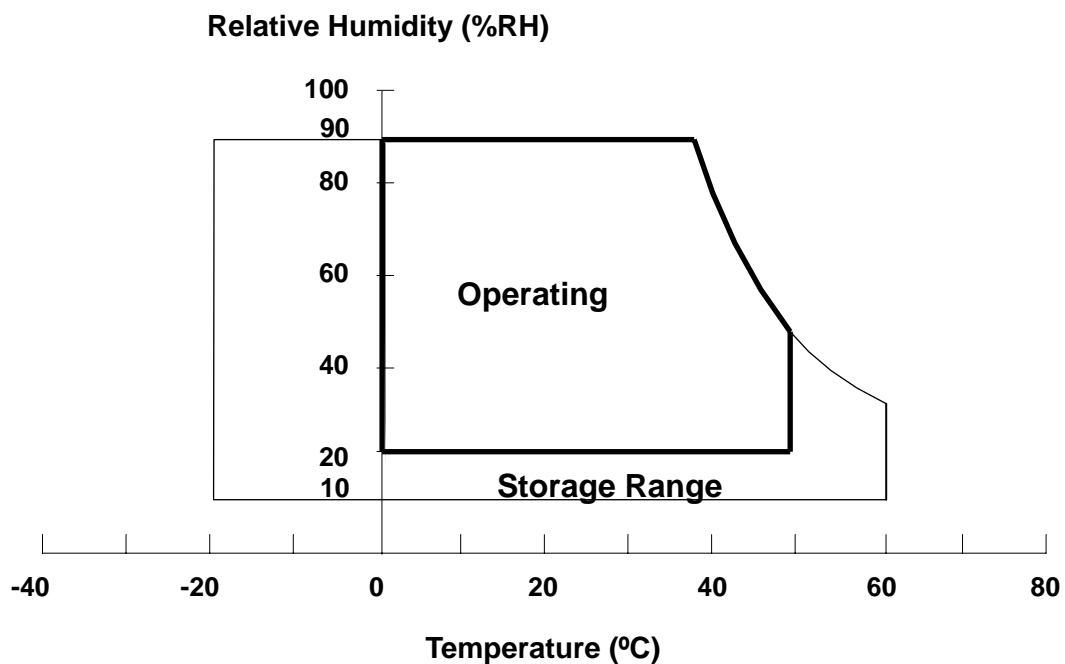
Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	$T_{ST}$	-20	+60	°C	(1)
Operating Ambient Temperature	$T_{OP}$	0	+50	°C	(1), (2)

Note (1) (a) 90 %RH Max. ( $T_a \leq 40$  °C).

(b) Wet-bulb temperature should be 39 °C Max. ( $T_a > 40$  °C).

(c) No condensation.

Note (2) The temperature of panel surface should be 0 °C min. and 60 °C max.



### 3.2 ELECTRICAL ABSOLUTE RATINGS

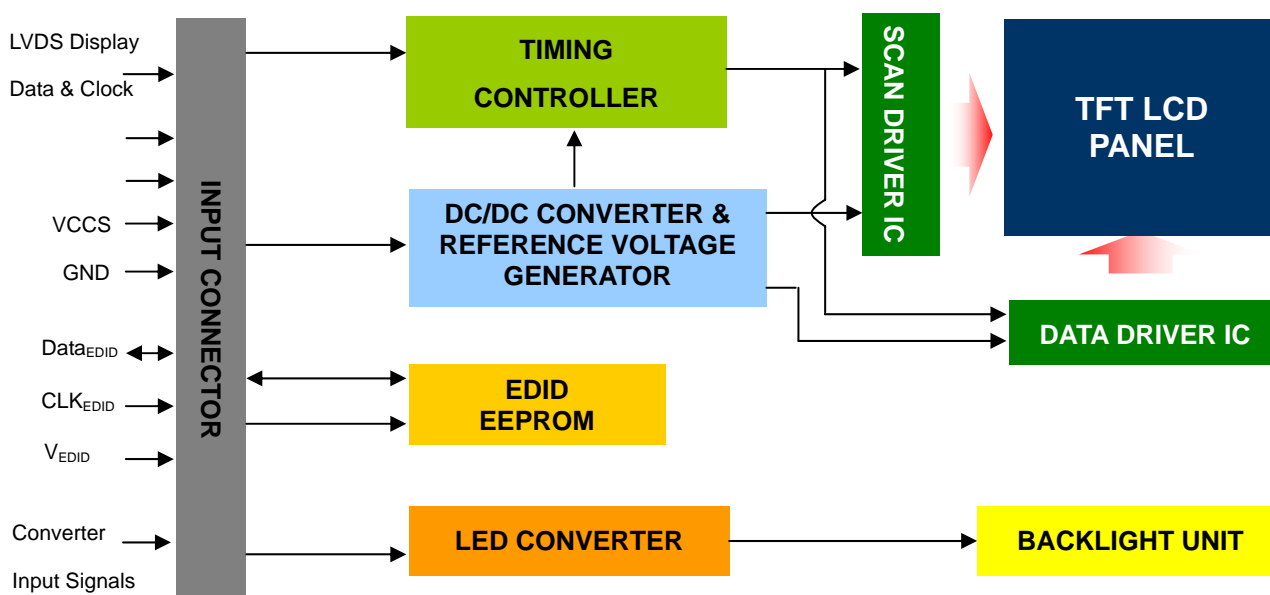
#### 3.2.1 TFT LCD MODULE

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	VCCS	-0.3	+4.0	V	(1)
Logic Input Voltage	V <sub>IN</sub>	-0.3	VCCS+0.3	V	
Converter Input Voltage	LED_VCCS	-0.3	25	V	(1)
Converter Control Signal Voltage	LED_PWM,	-0.3	5	V	(1)
Converter Control Signal Voltage	LED_EN	-0.3	5	V	(1)

Note (1) Stresses beyond those listed in above “ELECTRICAL ABSOLUTE RATINGS” may cause permanent damage to the device. Normal operation should be restricted to the conditions described in “ELECTRICAL CHARACTERISTICS”.

## 4. ELECTRICAL SPECIFICATIONS

### 4.1 FUNCTION BLOCK DIAGRAM



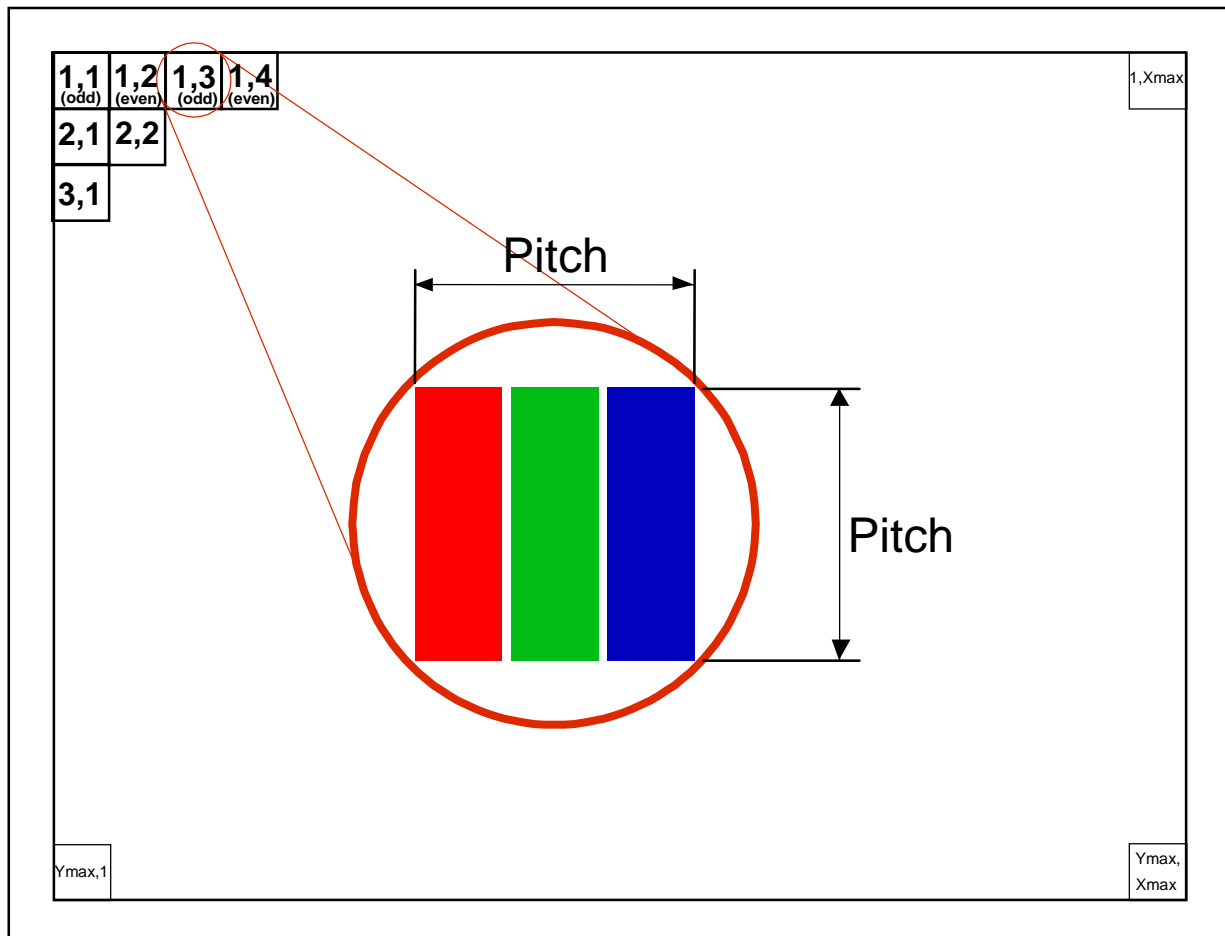
## 4.2. INTERFACE CONNECTIONS

### PIN ASSIGNMENT

Pin	Symbol	Description	Remark
1	NC	No Connection (Reserve)	
2	VCCS	Power Supply (3.3V typ.)	
3	VCCS	Power Supply (3.3V typ.)	
4	VEDID	DDC 3.3V power	
5	NC	No Connection (Reserved for CMI test)	
6	CLKEDID	DDC clock	
7	DATAEDID	DDC data	
8	Rxin0-	LVDS differential data input	R0-R5, G0
9	Rxin0+	LVDS differential data input	
10	VSS	Ground	
11	Rxin1-	LVDS differential data input	G1~G5, B0, B1
12	Rxin1+	LVDS differential data input	
13	VSS	Ground	
14	Rxin2-	LVDS Differential Data Input	B2-B5,HS,VS, DE
15	Rxin2+	LVDS Differential Data Input	
16	VSS	Ground	
17	RxCLK-	LVDS differential clock input	LVDS CLK
18	RxCLK+	LVDS differential clock input	
19	NC	No Connection (Reserved for CMO test)	
20	NC	No Connection (Reserve)	
21	NC	No Connection (Reserve)	
22	VSS	Ground	
23	NC	No Connection (Reserve)	
24	NC	No Connection (Reserve)	
25	VSS	Ground	
26	NC	No Connection (Reserve)	
27	NC	No Connection (Reserve)	
28	VSS	Ground	
29	NC	No Connection (Reserve)	
30	NC	No Connection (Reserve)	
31	LED_GND	LED Ground	
32	LED_GND	LED Ground	
33	LED_GND	LED Ground	
34	NC	No Connection (Reserve)	
35	LED_PWM	PWM Control Signal of LED Converter	
36	LED_EN	Enable Control Signal of LED Converter	
37	NC	No Connection (Reserved for CMI test)	
38	LED_VCCS	LED Power Supply	
39	LED_VCCS	LED Power Supply	
40	LED_VCCS	LED Power Supply	



Note (1) The first pixel is odd as shown in the following figure.



### 4.3 ELECTRICAL CHARACTERISTICS

#### 4.3.1 LCD ELETRONICS SPECIFICATION

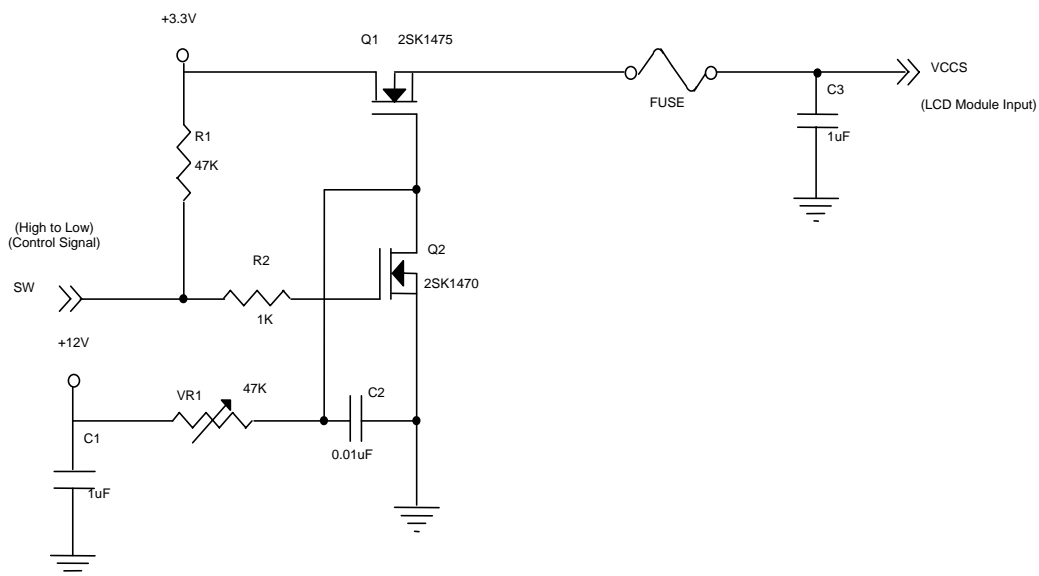
Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	VCCS	3.0	3.3	3.6	V	(1)-
Ripple Voltage	V <sub>RP</sub>	-	50	-	mV	(1)-
Inrush Current	I <sub>RUSH</sub>	-	-	1.5	A	(1),(2)
Power Supply Current	Mosaic	-	(209)	(225)	mA	(3)a
	Black	-	(242)	(261)	mA	(3)b

Note (1) The ambient temperature is  $T_a = 25 \pm 2$  °C.

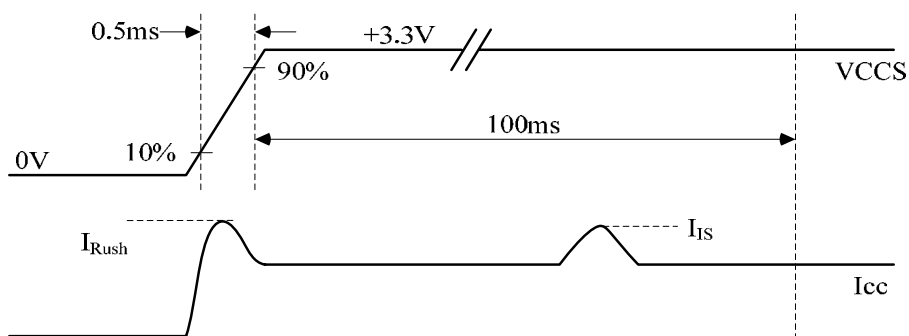
Note (2) I<sub>RUSH</sub>: the maximum current when VCCS is rising

I<sub>IS</sub>: the maximum current of the first 100ms after power-on

Measurement Conditions: Shown as the following figure. Test pattern: black.

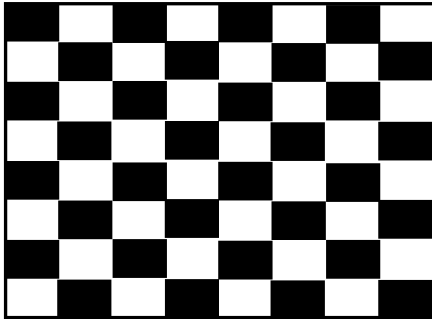


**VCCS rising time is 0.5ms**



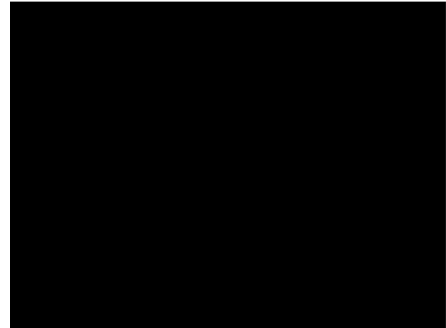
Note (3) The specified power supply current is under the conditions at  $V_{CCS} = 3.3 \text{ V}$ ,  $T_a = 25 \pm 2 \text{ }^\circ\text{C}$ , DC Current and  $f_v = 60 \text{ Hz}$ , whereas a power dissipation check pattern below is displayed.

a. Mosaic Pattern



Active Area

b. Black Pattern

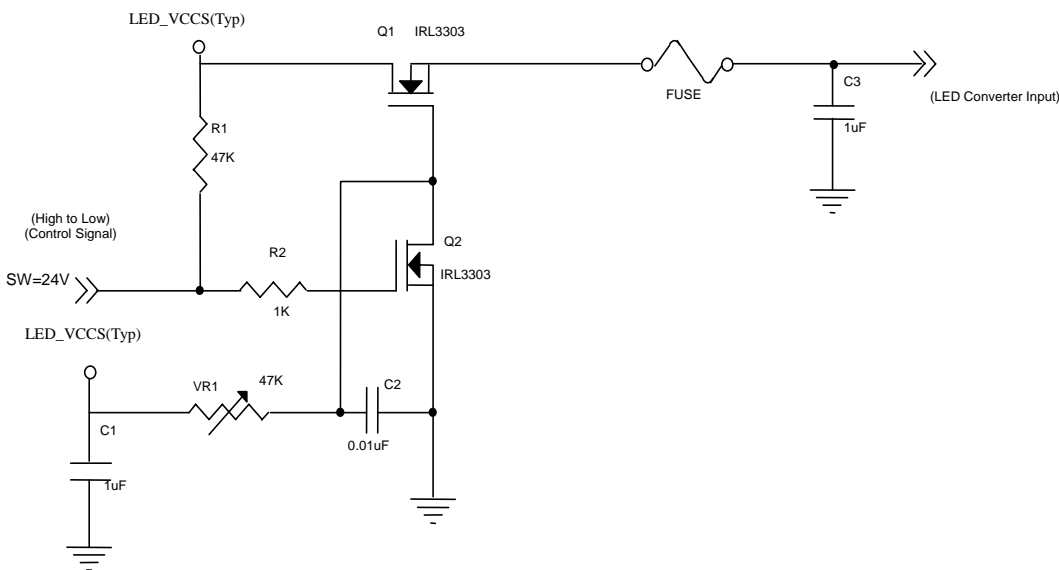


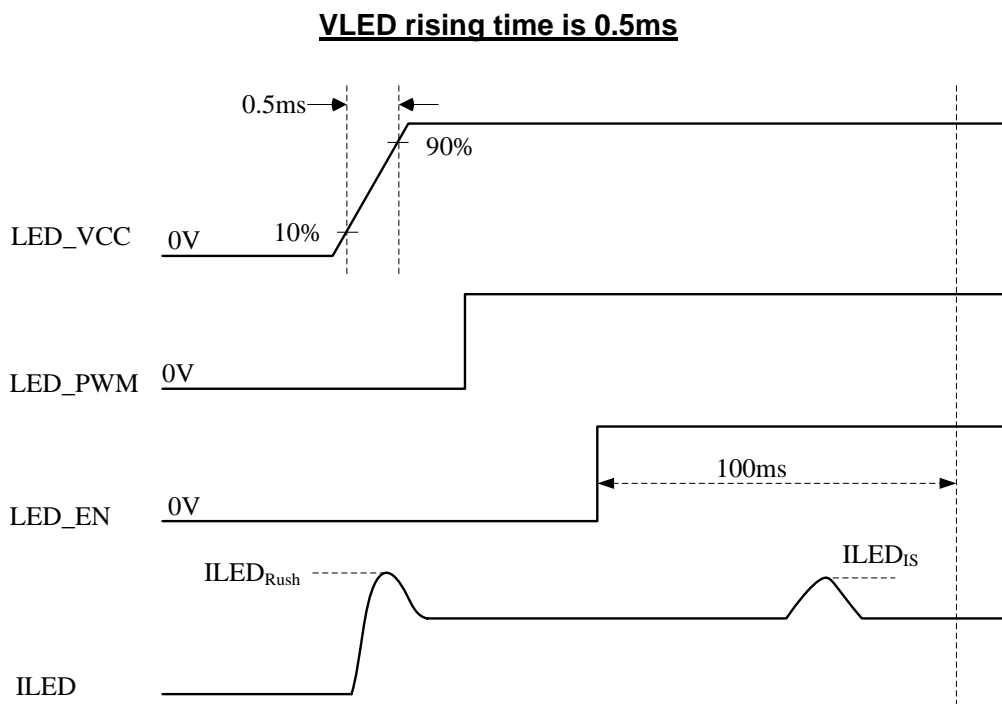
Active Area

4.3.2 LED CONVERTER SPECIFICATION

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Converter Input power supply voltage		LED_Vccs	5	12.0	21.0	V	
Converter Inrush Current		I <sub>LED<sub>RUSH</sub></sub>	-	-	1.5	A	(1)
EN Control Level	Backlight On		2.3	-	5	V	
	Backlight Off		0	-	0.5	V	
PWM Control Level	PWM High Level		2.3	-	5	V	
	PWM Low Level		0	-	0.5	V	
PWM Control Duty Ratio			10	-	100	%	
			5	-	100	%	(2)
PWM Control Permissive Ripple Voltage		V <sub>PWM_pp</sub>	-	-	100	mV	
PWM Control Frequency		f <sub>PWM</sub>	190	-	2K	Hz	(3)
LED Power Current	LED_VCCS =Typ.	I <sub>LED</sub>	(108)	(139)	(151)	mA	(4)

Note (1) I<sub>LED<sub>RUSH</sub></sub>: the maximum current when LED\_VCCS is rising,  
 I<sub>LED<sub>IS</sub></sub>: the maximum current of the first 100ms after power-on,  
 Measurement Conditions: Shown as the following figure. LED\_VCCS = Typ, Ta = 25 ± 2 °C, f<sub>PWM</sub> = 200 Hz, Duty=100%.





Note (2) If the PWM control duty ratio is less than 10%, there is some possibility that acoustic noise or backlight flash can be found. And it is also difficult to control the brightness linearity.

Note (3) If PWM control frequency is applied in the range less than 1KHz, the “waterfall” phenomenon on the screen may be found. To avoid the issue, it’s a suggestion that PWM control frequency should follow the criterion as below.

PWM control frequency  $f_{PWM}$  should be in the range

$$(N + 0.33) * f \leq f_{PWM} \leq (N + 0.66) * f$$

$N$  : Integer ( $N \geq 3$ )

$f$  : Frame rate

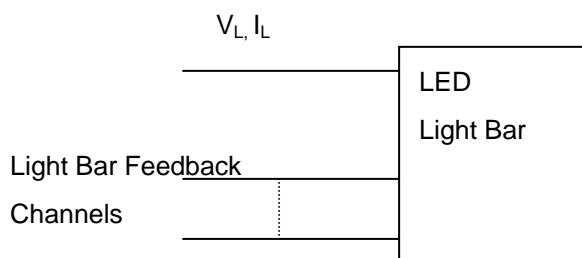
Note (4) The specified LED power supply current is under the conditions at “LED\_VCCS = Typ.”,  $T_a = 25 \pm 2^\circ\text{C}$ ,  $f_{PWM} = 200\text{ Hz}$ , Duty=100%.

4.3.3 BACKLIGHT UNIT

Ta = 25 ± 2 °C

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
LED Light Bar Power Supply Voltage	V <sub>L</sub>	25	29	30	V	(1)(2)(Duty100%)
LED Light Bar Power Supply Current	I <sub>L</sub>	46.55	49	51.45	mA	
Power Consumption	P <sub>L</sub>	1.16	1.43	1.55	W	(3)
LED Life Time	L <sub>BL</sub>	12000	-	-	Hrs	(4)

Note (1) LED current is measured by utilizing a high frequency current meter as shown below :



Note (2) For better LED light bar driving quality, it is recommended to utilize the adaptive boost converter with current balancing function to drive LED light-bar.

Note (3)  $P_L = I_L \times V_L$  (Without LED converter transfer efficiency)

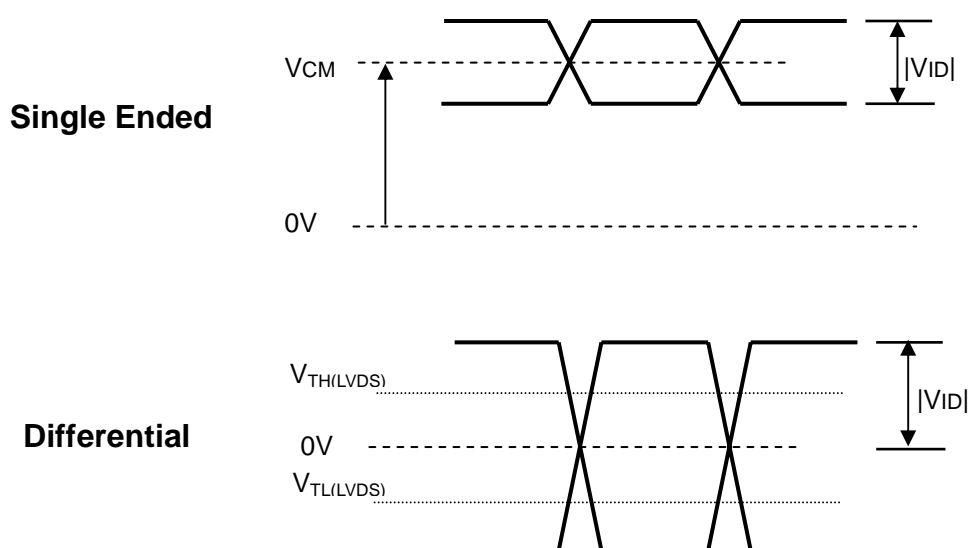
Note (4) The lifetime of LED is defined as the time when it continues to operate under the conditions at Ta = 25 ±2 °C and I<sub>L</sub> = 24.5 mA(Per EA) until the brightness becomes 50% of its original value.

#### 4.4 LVDS INPUT SIGNAL TIMING SPECIFICATIONS

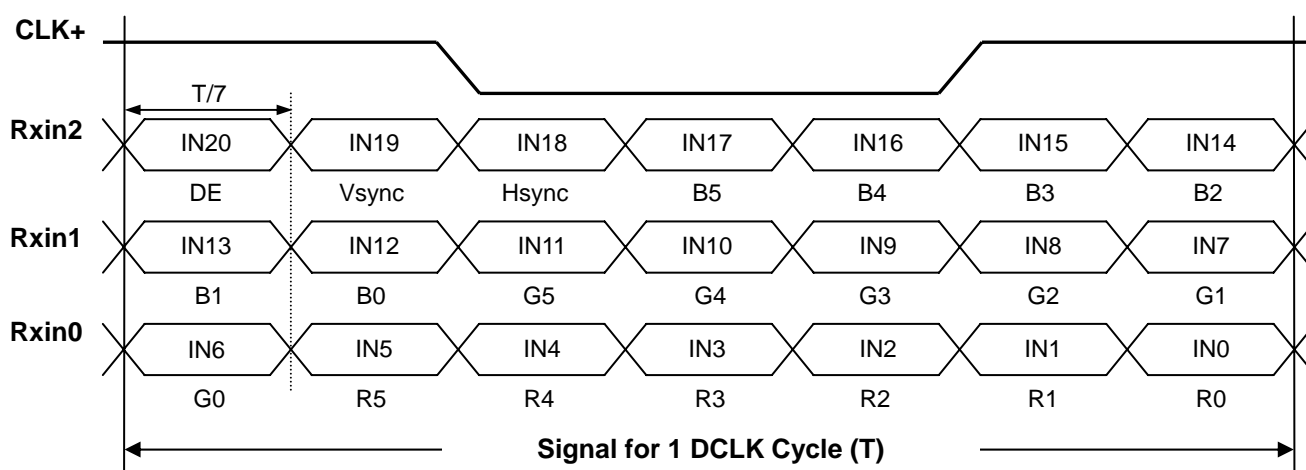
##### 4.4.1 LVDS DC SPECIFICATIONS

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
LVDS Differential Input High Threshold	$V_{TH(LVDS)}$	-	-	+100	mV	(1), $V_{CM}=1.2V$
LVDS Differential Input Low Threshold	$V_{TL(LVDS)}$	-100	-	-	mV	(1) $V_{CM}=1.2V$
LVDS Common Mode Voltage	$V_{CM}$	1.125	-	1.375	V	(1)
LVDS Differential Input Voltage	$ V_{ID} $	100	-	600	mV	(1)
LVDS Terminating Resistor	$R_T$	-	100	-	Ohm	-

Note (1) The parameters of LVDS signals are defined as the following figures.



##### 4.4.2 LVDS DATA FORMAT



### 4.4.3 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 6-bit gray scale data input for the color. The higher the binary input the brighter the color. The table below provides the assignment of color versus data input.

Color		Data Signal																	
		Red						Green						Blue					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	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
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	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
Gray Scale Of Red	Red(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
	Red(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	Red(61)	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	
	Red(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
	Red(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	
Gray Scale Of Green	Green(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
	Green(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	Green(61)	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	
	Green(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	
	Green(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	
Gray Scale Of Blue	Blue(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	Blue(61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	
	Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	
	Blue(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	

Note (1) 0: Low Level Voltage, 1: High Level Voltage



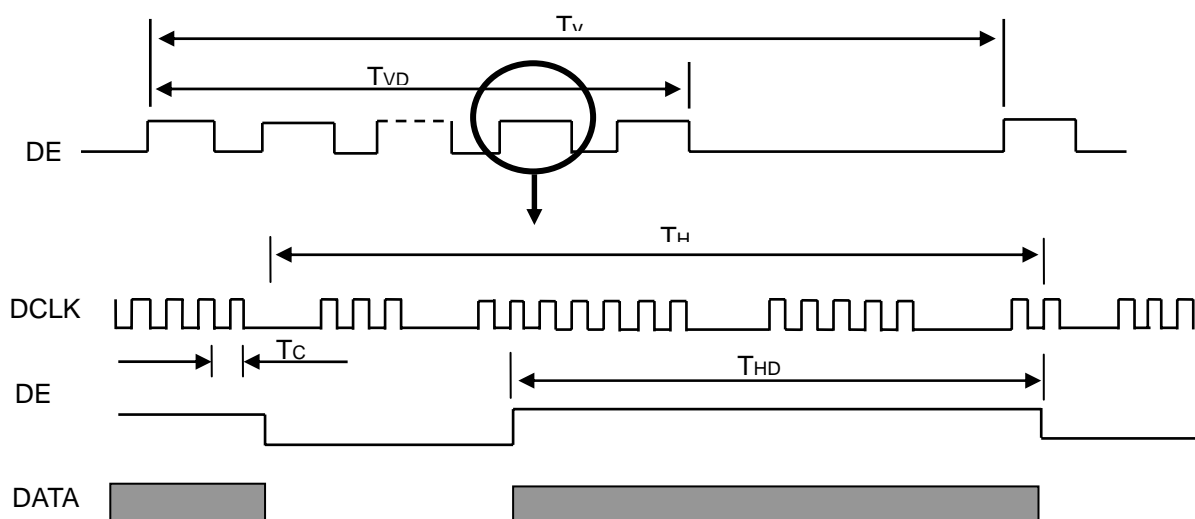
#### 4.5 DISPLAY TIMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK	Frequency	1/Tc	(63.9)	71	(74.55)	MHz	-
DE	Vertical Total Time	TV	(775)	788	(793)	TH	-
	Vertical Active Display Period	TVD	768	768	768	TH	-
	Vertical Active Blanking Period	TVB	TV-TVD	20	TV-TVD	TH	-
	Horizontal Total Time	TH	(1446)	1500	(1534)	Tc	-
	Horizontal Active Display Period	THD	1366	1366	1366	Tc	-
	Horizontal Active Blanking Period	THB	TH-THD	134	TH-THD	Tc	-

Note (1) Because this module is operated by DE only mode, Hsync and Vsync are ignored.

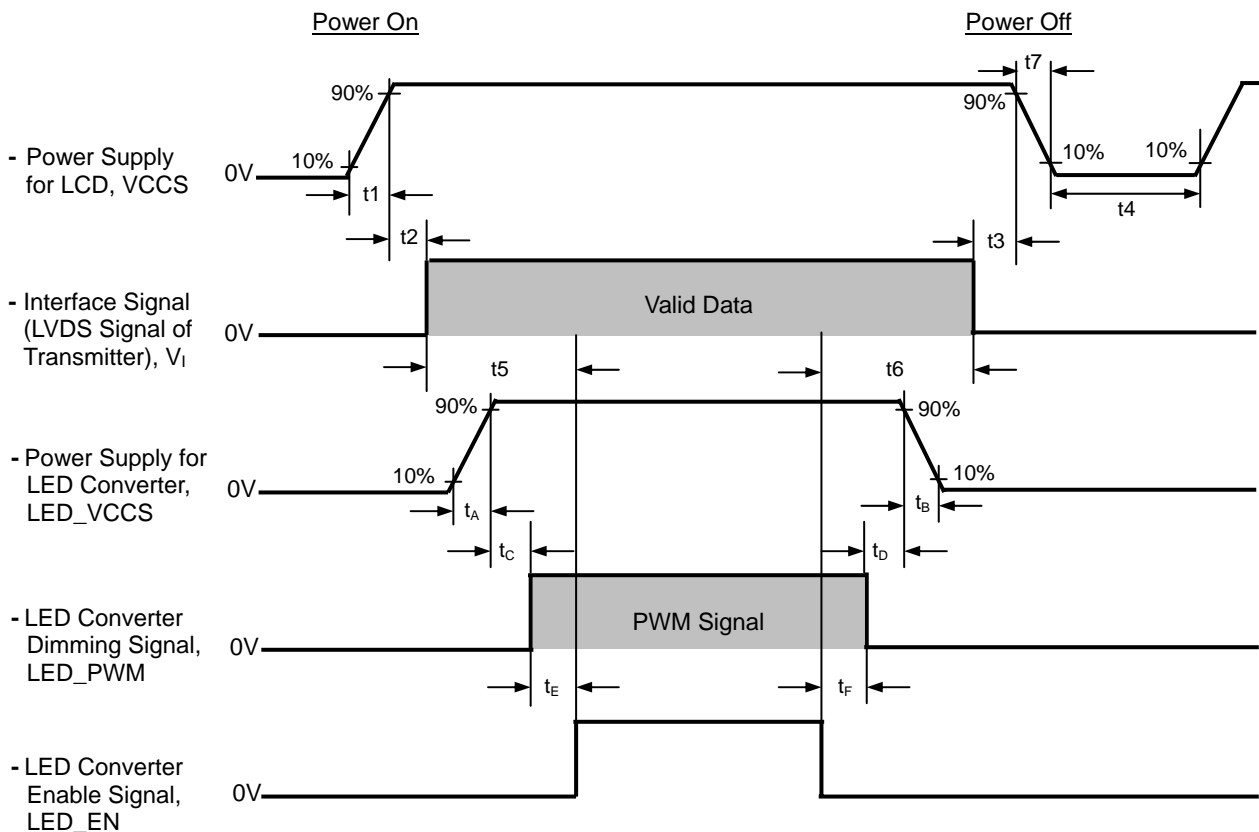
**INPUT SIGNAL TIMING DIAGRAM**



#### 4.6 POWER ON/OFF SEQUENCE

The power sequence specifications are shown as the following table and diagram.

Symbol	Value			Unit	Note
	Min.	Typ.	Max.		
t1	0.5	-	10	ms	
t2	0	-	50	ms	
t3	0	-	50	ms	
t4	500	-	-	ms	
t5	200	-	-	ms	
t6	200	-	-	ms	
t7	0.5	-	10	ms	
t <sub>A</sub>	0.5	-	10	ms	
t <sub>B</sub>	0	-	10	ms	
t <sub>C</sub>	10	-	-	ms	
t <sub>D</sub>	10	-	-	ms	
t <sub>E</sub>	10	-	-	ms	
t <sub>F</sub>	10	-	-	ms	



Note (1) Please don't plug or unplug the interface cable when system is turned on.

Note (2) Please avoid floating state of the interface signal during signal invalid period.

Note (3) It is recommended that the backlight power must be turned on after the power supply for LCD and the interface signal is valid.

## 5. OPTICAL CHARACTERISTICS

### 5.1 TEST CONDITIONS

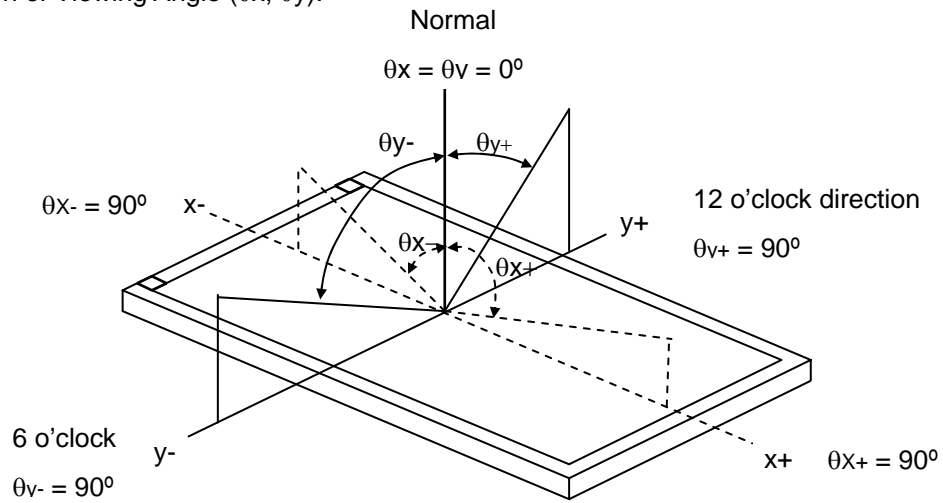
Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	V <sub>CC</sub>	3.3	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
LED Light Bar Input Current	I <sub>L</sub>	49	mA

The measurement methods of optical characteristics are shown in Section 5.2. The following items should be measured under the test conditions described in Section 5.1 and stable environment shown in Note (5).

### 5.2 OPTICAL SPECIFICATIONS

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Contrast Ratio	CR	$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing Normal Angle	300	500	-	-	(2), (5), (7)	
Response Time	T <sub>R</sub>		-	<b>3</b>	<b>8</b>	ms	(3), (7)	
	T <sub>F</sub>		-	<b>7</b>	<b>12</b>	ms		
Average Luminance of White	L <sub>Ave</sub>		170	200	-	cd/m <sup>2</sup>	(4), (6) (7)	
Color Chromaticity	Red		R <sub>x</sub>	Typ - 0.03	(0.587)	Typ + 0.03	-	(1), (7)
			R <sub>y</sub>		(0.342)		-	
	Green		G <sub>x</sub>		(0.322)		-	
			G <sub>y</sub>		(0.566)		-	
	Blue		B <sub>x</sub>		(0.153)		-	
			B <sub>y</sub>		(0.135)		-	
	White	W <sub>x</sub>	0.313		-			
		W <sub>y</sub>	0.329		-			
Viewing Angle	Horizontal	$\theta_{x+}$	40	45	-	Deg.	(1),(5) (7)	
		$\theta_{x-}$	40	45	-			
	Vertical	$\theta_{y+}$	15	20	-			
		$\theta_{y-}$	40	45	-			
White Variation	$\delta W_{5p}$	$\theta_x=0^\circ, \theta_y=0^\circ$			1.25	-	(5),(6) , (7)	
	$\delta W_{13p}$	$\theta_x=0^\circ, \theta_y=0^\circ$			1.6	-		

Note (1) Definition of Viewing Angle ( $\theta_x, \theta_y$ ):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

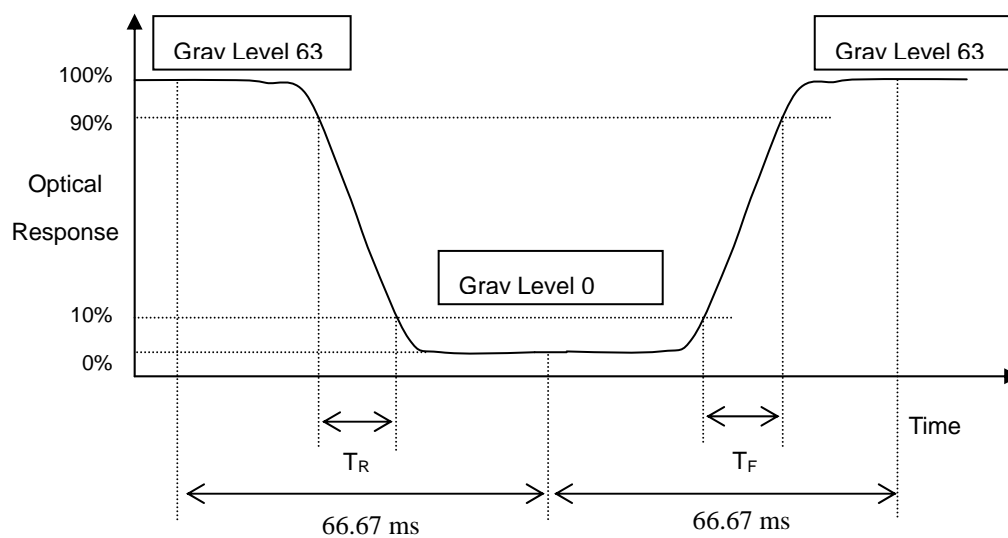
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

$$\text{CR} = \text{CR} (1)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Response Time ( $T_R, T_F$ ):



Note (4) Definition of Average Luminance of White ( $L_{AVE}$ ):

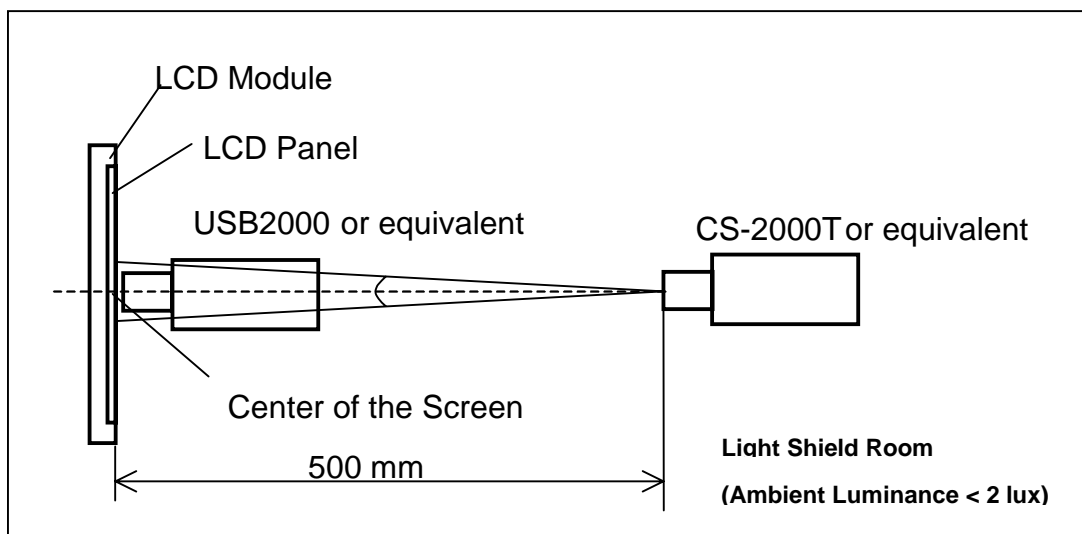
Measure the luminance of gray level 63 at 5 points

$$L_{AVE} = [L(1) + L(2) + L(3) + L(4) + L(5)] / 5$$

L(x) is corresponding to the luminance of the point X at Figure in Note (6)

Note (5) Measurement Setup:

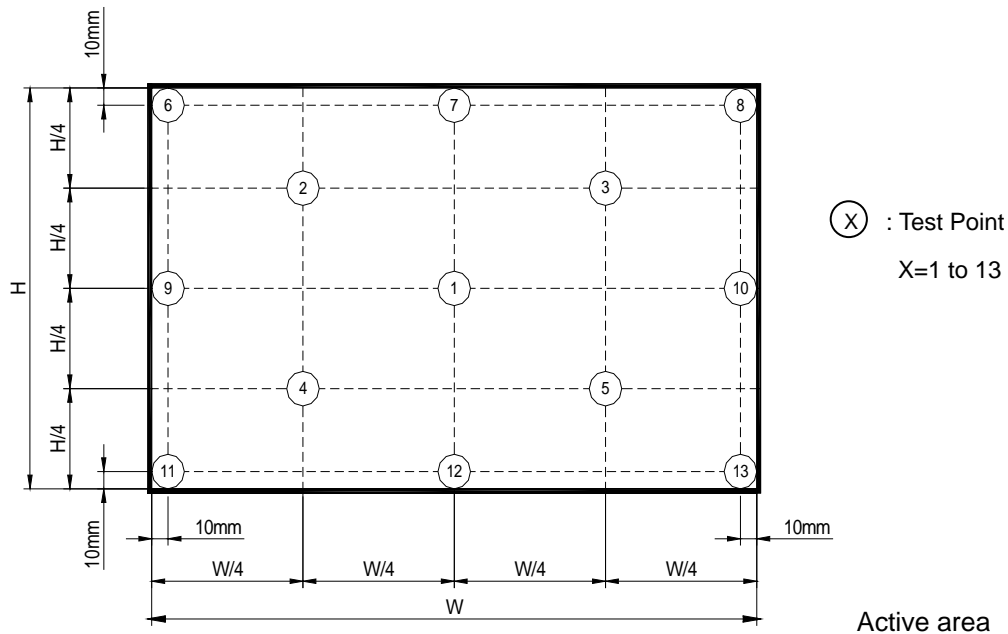
The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



Note (6) Definition of White Variation ( $\delta W$ ):

Measure the luminance of gray level 63 at 5 points

$$\delta W_{5p} = \{ \text{Minimum} [L(1) \sim L(5)] / \text{Maximum} [L(1) \sim L(5)] \} * 100\%$$



Note (7) The listed optical specifications refer to the initial value of manufacture, but the condition of the specifications after long-term operation will not be warranted.

## 6. RELIABILITY TEST ITEM

Test Item	Test Condition	Note
High Temperature Storage Test	60°C, 240 hours	(1) (2)
Low Temperature Storage Test	-20°C, 240 hours	
Thermal Shock Storage Test	-20°C, 0.5hour 60 , 0.5hour; 100cycles, 1hour/cycle	
High Temperature Operation Test	50°C, 240 hours	
Low Temperature Operation Test	0°C, 240 hours	
High Temperature & High Humidity Operation Test	50°C, RH 80%, 240hours	
ESD Test (Operation)	150pF, 330 , 1sec/cycle Condition 1 : Contact Discharge, ±8KV Condition 2 : Air Discharge, ±15KV	(1)
Shock (Non-Operating)	220G, 2ms, half sine wave, 1 time for each direction of ±X,±Y,±Z	(1)(3)
Vibration (Non-Operating)	1.5G / 10-500 Hz, Sine wave, 30 min/cycle, 1cycle for each X, Y, Z	(1)(3)

Note (1) criteria : Normal display image with no obvious non-uniformity and no line defect.

Note (2) Evaluation should be tested after storage at room temperature for more than two hour

Note (3) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

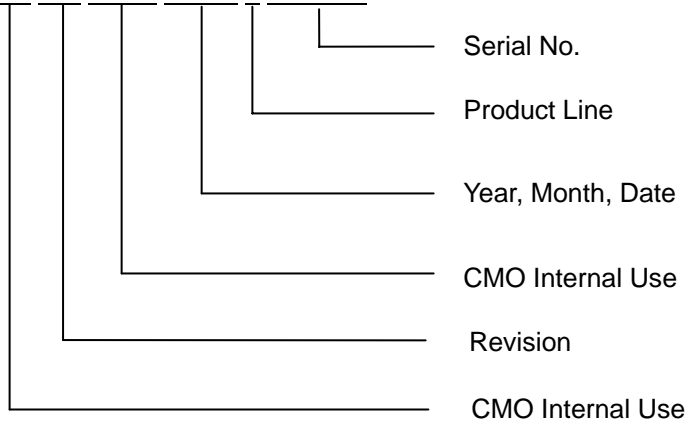
## 7. PACKING

### 7.1 MODULE LABEL

The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



- (a) Model Name: N116BGE – L32
- (b) Revision: Rev. XX, for example: C1, C2 ...etc.
- (c) Serial ID: XXXXXXYMDLNNNN



Serial ID includes the information as below:

- (a) Manufactured Date: Year: 0~9, for 2010~2019  
 Month: 1~9, A~C, for Jan. ~ Dec.  
 Day: 1~9, A~Y, for 1<sup>st</sup> to 31<sup>st</sup>, exclude I, O and U
- (b) Revision Code: cover all the change
- (c) Serial No.: Manufacturing sequence of product
- (d) Product Line: 1 -> Line1, 2 -> Line 2, ...etc.
- (e) UL Logo : XXXX is UL factory ID.



7.2 CARTON

Box Dimensions : 489(L)\*382(W)\*275(H)  
Weight: Approx. 11kg(40 module .per. 1 box)

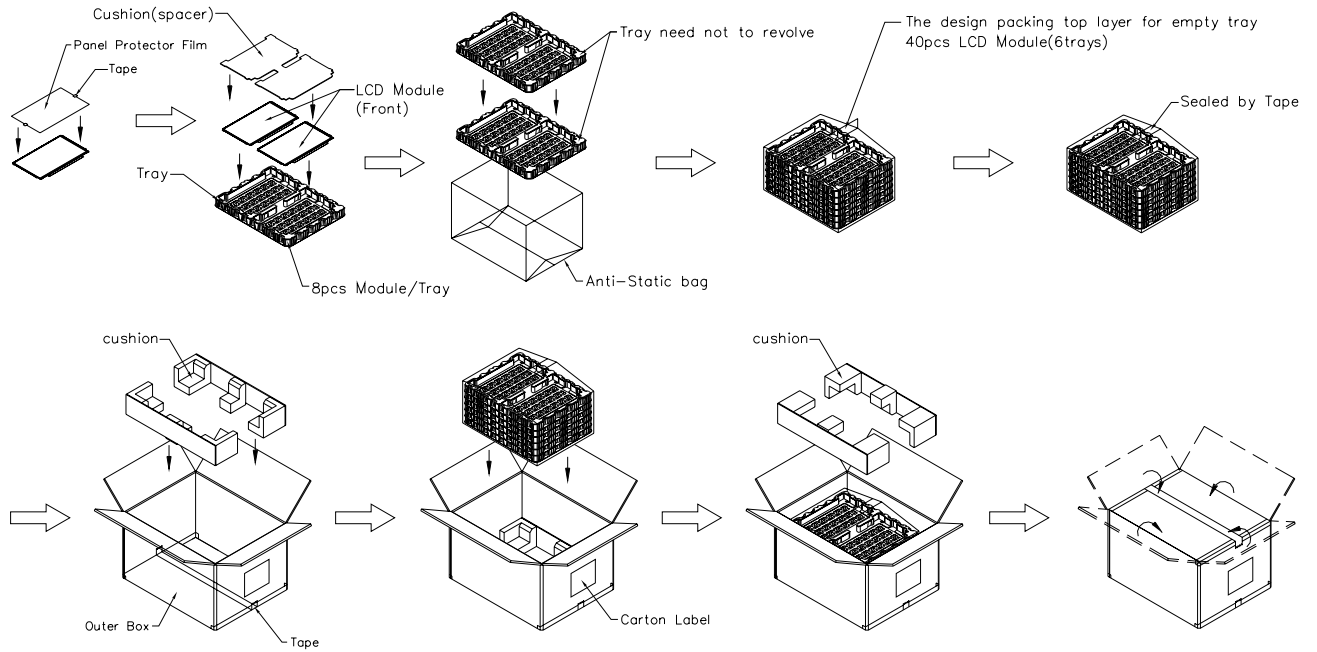


Figure. 7-2 Packing method

7.3 PALLET

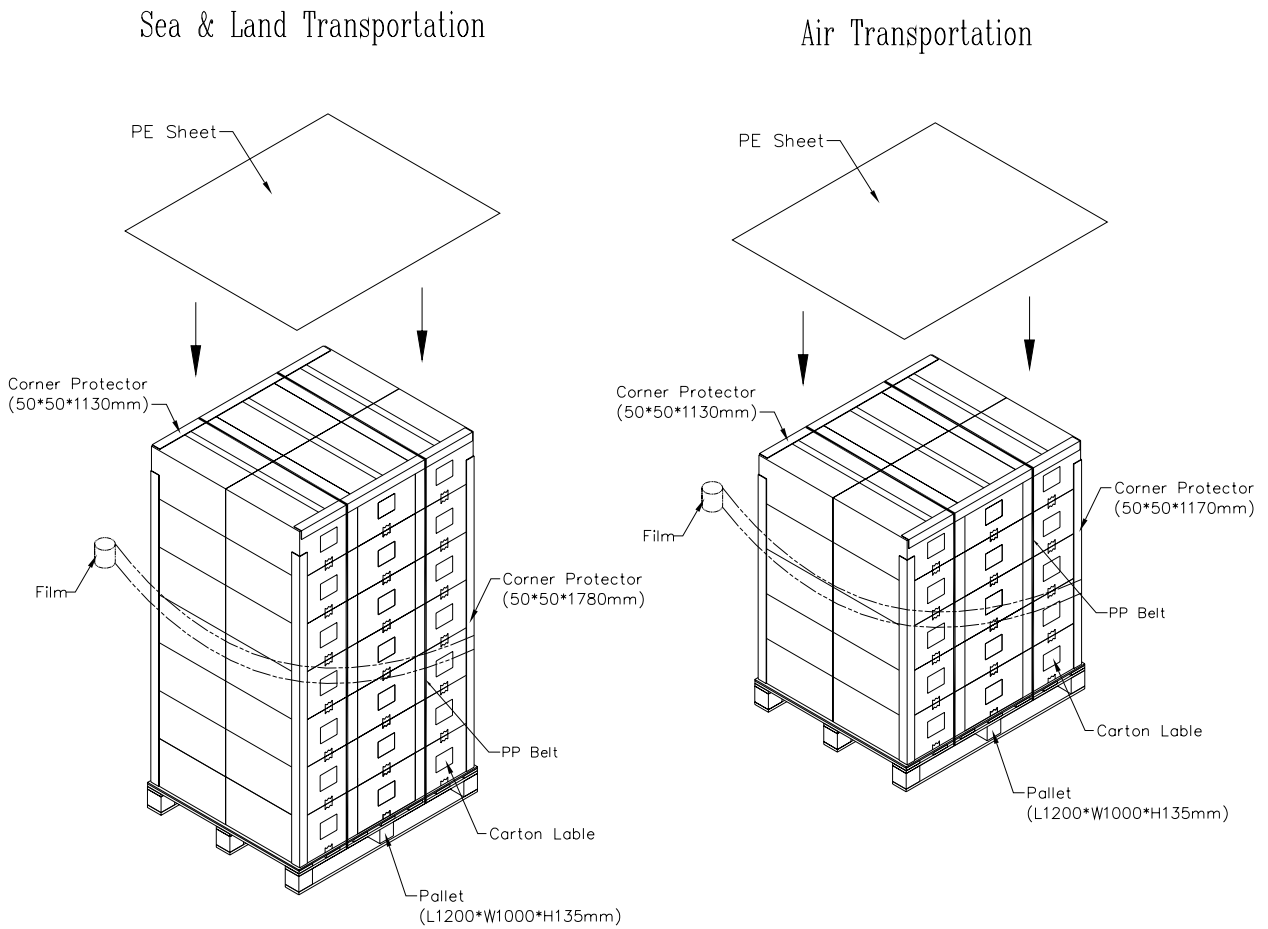


Figure. 7-3 Packing method

## **8. PRECAUTIONS**

### **8.1 HANDLING PRECAUTIONS**

- (1) The module should be assembled into the system firmly by using every mounting hole. Be careful not to twist or bend the module.
- (2) While assembling or installing modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
- (3) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (4) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily scratched.
- (5) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.
- (6) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.
- (7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.
- (8) Protect the module from static electricity, it may cause damage to the C-MOS Gate Array IC.
- (9) Do not disassemble the module.
- (10) Do not pull or fold the LED wire.
- (11) Pins of I/F connector should not be touched directly with bare hands.

### **8.2 STORAGE PRECAUTIONS**

- (1) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
- (2) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
- (3) It may reduce the display quality if the ambient temperature is lower than 10 °C. For example, the response time will become slowly, and the starting voltage of LED will be higher than the room temperature.

### **8.3 OPERATION PRECAUTIONS**

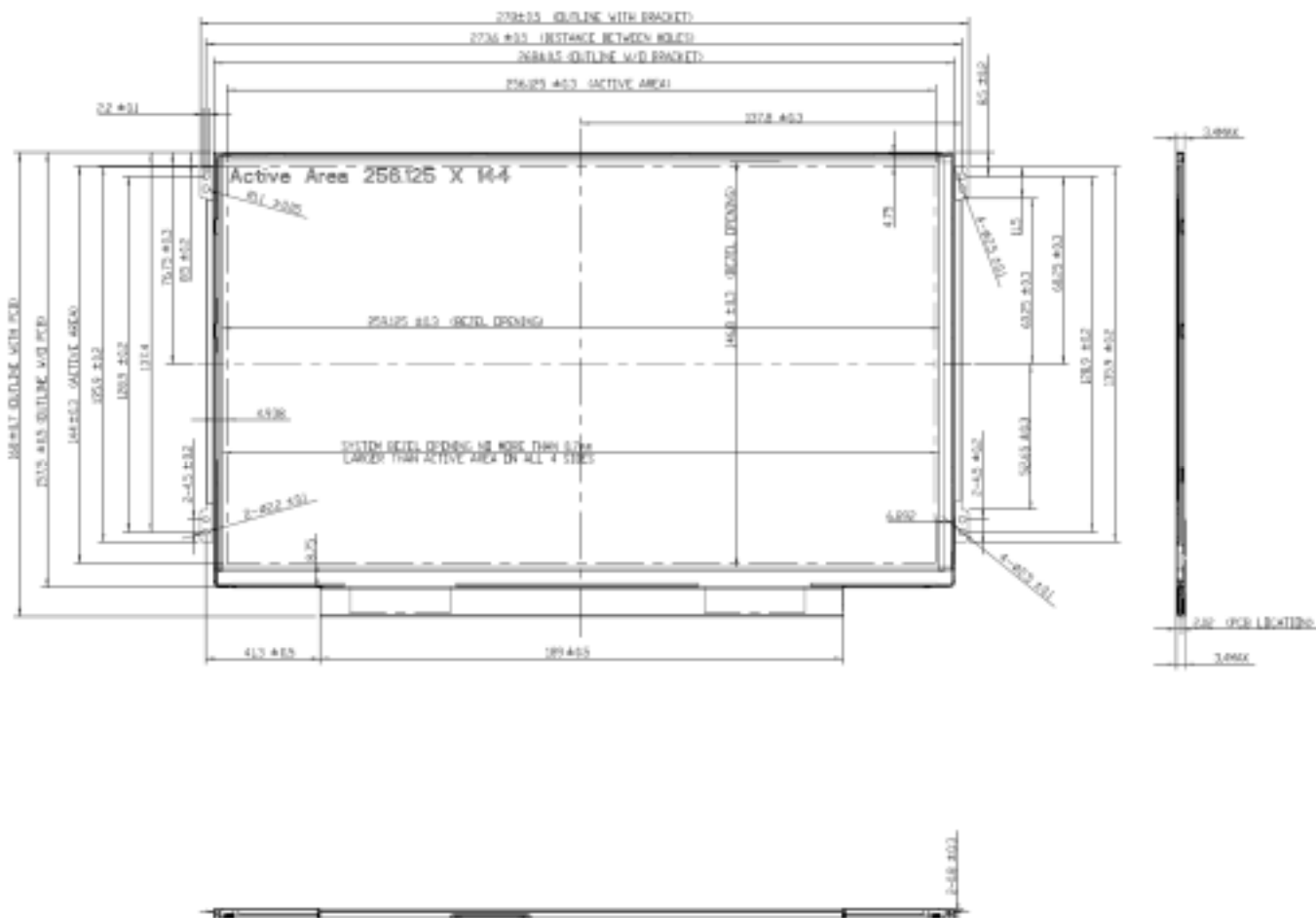
- (1) Do not pull the I/F connector in or out while the module is operating.
- (2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.
- (3) The startup voltage of Backlight is approximately 1000 Volts. It may cause electrical shock while assembling with converter. Do not disassemble the module or insert anything into the Backlight unit.

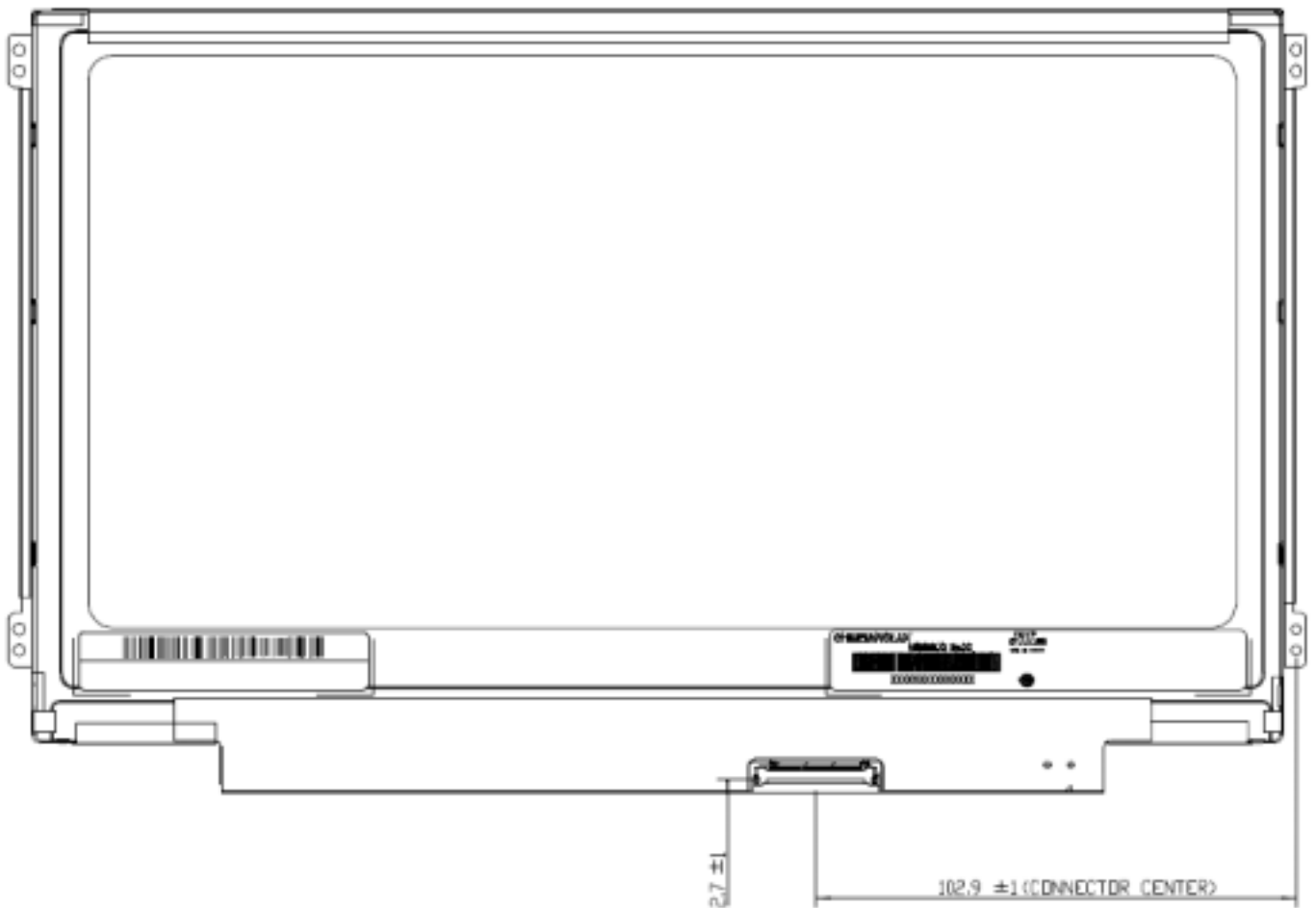
**Appendix. EDID DATA STRUCTURE**

The EDID (Extended Display Identification Data) data formats are to support displays as defined in the VESA Plug & Display and FPD standards.

TBD

Appendix. OUTLINE DRAWING





NOTES :

1. FLATNESS 0.5 mm MAX
2. LCD MODULE INPUT CONNECTOR: 1PEX, 20455-040E-12 OR EQUIVALENT.
3. IN ORDER TO AVOID ABNORMAL DISPLAY, POOLING AND WHITE SPOT, NO OVERLAPPING IS SUGGESTED AT CABLES, ANTENNAS, CAMERA, WLAN, WAM OR OTHER FOREIGN OBJECTS OVER COF DRIVER IC, TCON AND VR LOCATION.
4. "( )" MARKS THE REFERENCE DIMENSION.