

## TFT LCD Approval Specification

# MODEL NO.: N141C3 - L01

Customer:

Approved by:

Note:

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**REVISION HISTORY**

Version	Date	Page (New)	Section	Description
0.0	Oct 11,'06	All	All	Tentative specification was first issued.
2.0	Mar. 12,'07	All	All	Approval specification was first issued.
2.1	May. 09,'07	14,15,16	5.5	Change EDID code (WWAN frequency change to 107.8 MHz)
	May. 15,'07	30	11	Outline drawing update (mylar location changed).

## 1 GENERAL DESCRIPTION

### 1.1 OVERVIEW

N141C3 - L01 is a 14.1" TFT Liquid Crystal Display module with single CCFL Backlight unit and 30 pins LVDS interface. This module supports 1440 x (3 RGB) x 900 WXGA+ mode and can display 262,144 colors. The optimum viewing angle is at 6 o'clock direction. The inverter module for backlight is not built in.

### 1.2 FEATURES

- Thin and Light Weight
- WXGA+ (1440 x 900 pixels) resolution
- DE only mode
- 3.3V LVDS (Low Voltage Differential Signaling) interface with 2 pixel/clock
- RoHS compliance

### 1.3 APPLICATION

- TFT LCD Notebook

### 1.4 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Active Area	303.48(H) X 189.675(V) (14.1 inch Diagonal)	mm	(1)
Bezel Opening Area	306.76 (H) x 193.0 (V)	mm	
Driver Element	a-si TFT active matrix	-	-
Pixel Number	1440 x R.G.B. x 900	pixel	-
Pixel Pitch	0.21075 (H) x 0.21075 (V)	mm	-
Pixel Arrangement	RGB vertical stripe	-	-
Display Colors	262,144	color	-
Transmissive Mode	Normally white	-	-
Surface Treatment	Anti-glare and Hard Coat , Haze 26, (3H min.)	-	-

### 1.5 MECHANICAL SPECIFICATIONS

Item	Min.	Typ.	Max.	Unit	Note	
Module Size	Horizontal(H)	319	319.5	320	mm	(1)
	Vertical(V)	205	205.5	206	mm	
	Depth(D)	--	5.2	5.5	mm	
Weight	--	425	430	g		

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

## 2 ABSOLUTE MAXIMUM RATINGS

### 2.1 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)
Shock (Non-Operating) $S_{NOP}$		-	220/2	G/ms	(3), (5)
Vibration (Non-Operating) $V_{NOP}$		-	1.5	G	(4), (5)

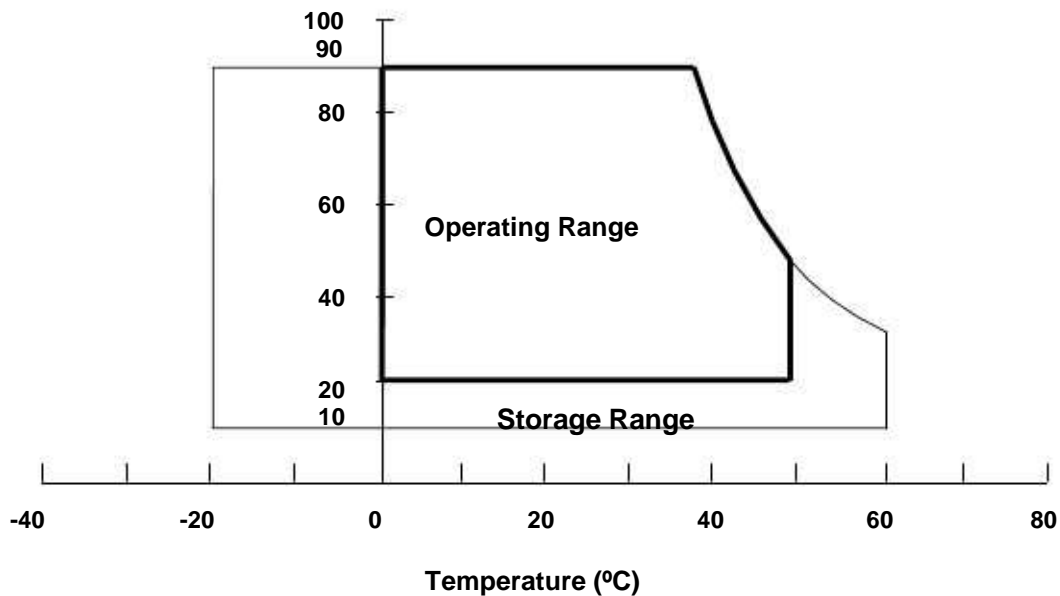
Note (1) (a) 90 %RH Max. ( $T_a \leq 40$  °C).

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

(c) No condensation.

Note (2) The temperature of panel display surface area should be 0 °C Min. and 60 °C Max..

#### Relative Humidity (%RH)



Note (3) 1 time for  $\pm X$ ,  $\pm Y$ ,  $\pm Z$ . for Condition (220G / 2ms) is half Sine Wave..

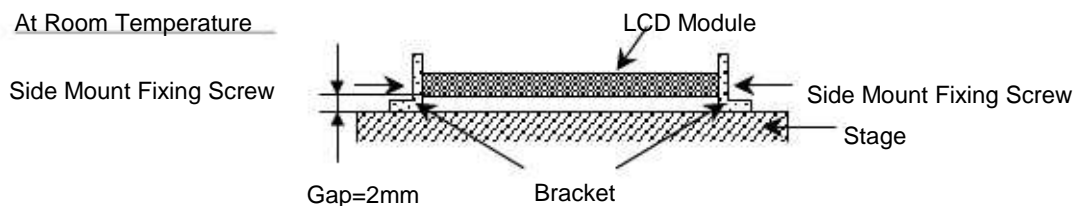
Note (4) 10 ~ 200 Hz, 30 min / Cycle, 1 cycles for each X, Y, Z axis.

Note (5) 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.

The fixing condition is shown as below:

At Room Temperature



## 2.2 ELECTRICAL ABSOLUTE RATINGS

## 2.2.1 TFT LCD MODULE

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	V <sub>CC</sub>	-0.3	+4.0	V	(1)
Logic Input Voltage	V <sub>IN</sub>	-0.3	V <sub>CC</sub> +0.3	V	

## 2.2.2 BACKLIGHT UNIT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Lamp Voltage	V <sub>L</sub>	-	2.5K	V <sub>RMS</sub>	(1), (2)
Lamp Current	I <sub>L</sub>	2.0	6.5	mA <sub>RMS</sub>	
Lamp Frequency	F <sub>L</sub>	45	80	KHz	(1), (2)

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for lamp (Refer to 3.2 for further information).

### 3 ELECTRICAL CHARACTERISTICS

#### 3.1 TFT LCD MODULE

Ta = 25 ± 2 °C

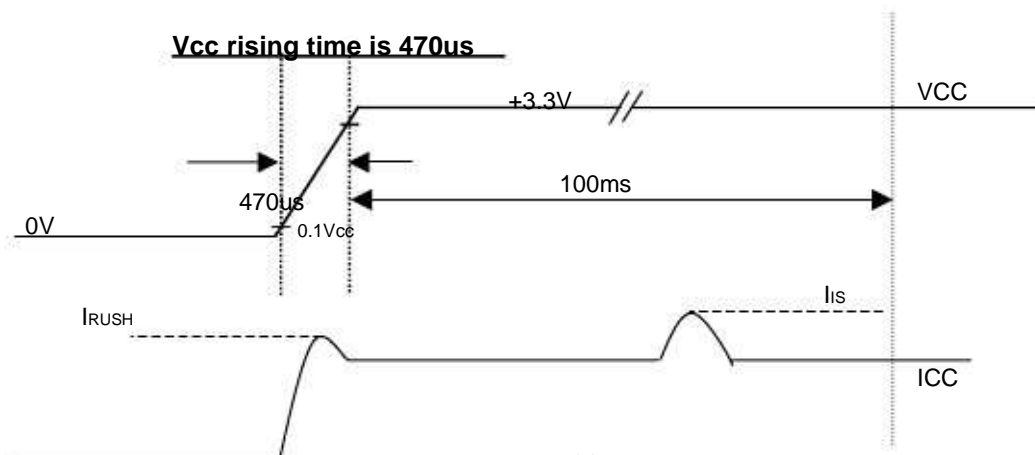
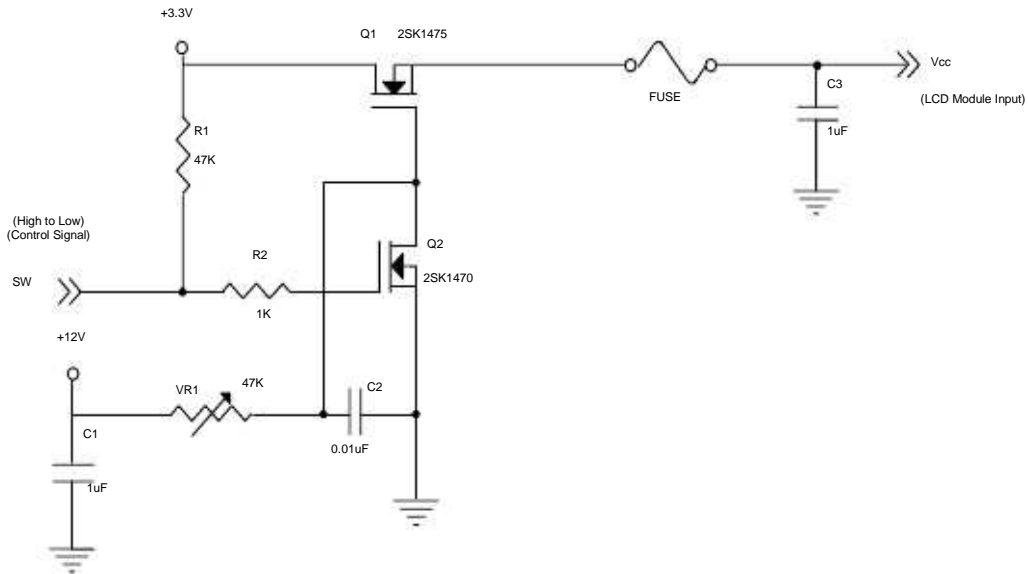
Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	V <sub>CC</sub>	3.0	3.3	3.6	V	-
Permissive Ripple Voltage	V <sub>RP</sub>	-	50	-	mV	-
Rush Current	I <sub>RUSH</sub>	-	-	1.5	A	(2)
Initial Stage Current	I <sub>IS</sub>	-	-	1.0	A	(2)
Power Supply Current	I <sub>CC</sub>	White	380	430	mA	(3)a
		Black	465	510	mA	(3)b
LVDS Differential Input High Threshold	V <sub>TH(LVDS)</sub>	-	-	+100	mV	V <sub>CM</sub> =1.2V (5)
LVDS Differential Input Low Threshold	V <sub>TL(LVDS)</sub>	-100	-	-	mV	V <sub>CM</sub> =1.2V (5)
LVDS Common Mode Voltage	V <sub>CM</sub>	1.125	-	1.375	V	(5)
LVDS Differential Input Voltage	V <sub>ID</sub>	100	-	600	mV	(4)
Terminating Resistor	R <sub>T</sub>	-	100	-	Ohm	-
Power per EBL WG	P <sub>EBL</sub>	-	3.69	-	W	-

Note (1) The ambient temperature is Ta = 25 ± 2 °C.

Note (2) I<sub>RUSH</sub>: the maximum current when V<sub>CC</sub> 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.



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

a. White Pattern



Active Area

b. Black Pattern

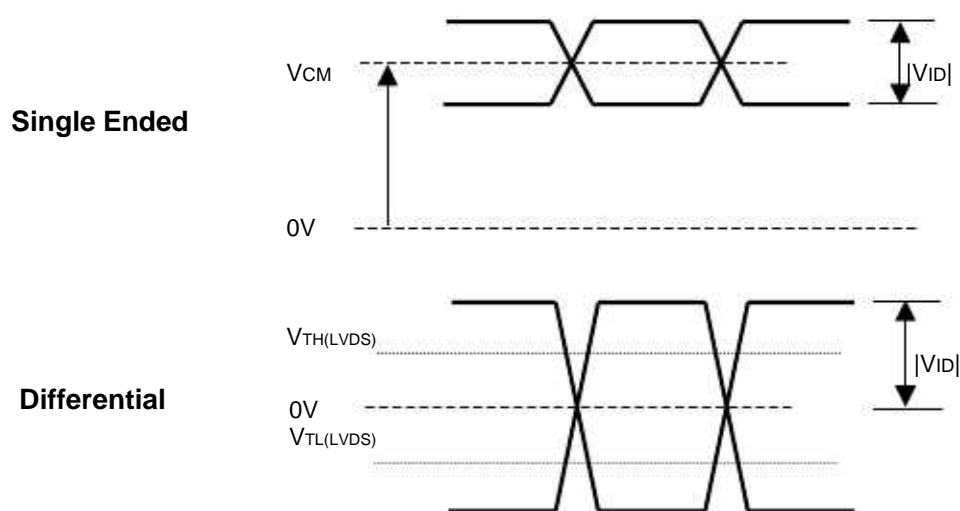


Active Area

Note (4) The specified power are the sum of LCD panel electronics input power and the inverter input power. Test conditions are as follows.

- (a)  $V_{CC} = 3.3\text{ V}$ ,  $T_a = 25 \pm 2\text{ }^\circ\text{C}$ ,  $f_v = 60\text{ Hz}$ ,
- (b) The pattern used is a black and white 32 x 36 checkerboard, slide #100 from the VESA file "Flat Panel Display Monitor Setup Patterns", FPDMSU.ppt.
- (c) Luminance: 60 nits.
- (d) The inverter used is provided from Sumida ([www.sumida.com.tw](http://www.sumida.com.tw)). Please contact Sumida for detail information. CMO doesn't provide the inverter in this product.

Note (5) The parameters of LVDS signals are defined as the following figures.



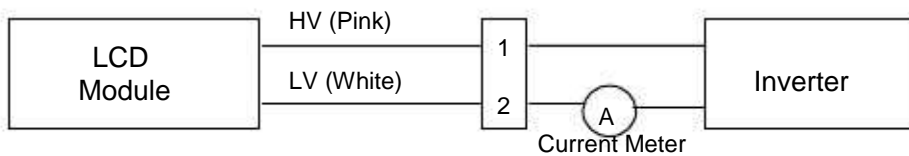


## 3.2 BACKLIGHT UNIT

Ta = 25 ± 2 °C

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Lamp Input Voltage	V <sub>L</sub>	612	680	748	V <sub>RMS</sub>	I <sub>L</sub> = 6.0 mA
Lamp Current	I <sub>L</sub>	2.0	6.0	6.5	mA <sub>RMS</sub>	(1)
Lamp Turn On Voltage	V <sub>s</sub>	-	-	1370 (25 °C)	V <sub>RMS</sub>	(2)
		-	-	1520 (0 °C)	V <sub>RMS</sub>	(2)
Operating Frequency	F <sub>L</sub>	45	-	80	KHz	(3)
		15,000	-	-	Hrs	(5)
Lamp Life Time	L <sub>BL</sub>	-	4.08	-	W	(4), I <sub>L</sub> = 6.0 mA
Power Consumption	P <sub>L</sub>	-	-	-	-	-

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



Note (2) The voltage that must be larger than V<sub>s</sub> should be applied to the lamp for more than 1 second after startup. Otherwise the lamp may not be turned on.

Note (3) The lamp frequency may produce interference with horizontal synchronous frequency from the display, and this may cause line flow on the display. In order to avoid interference, the lamp frequency should be detached from the horizontal synchronous frequency and its harmonics as far as possible.

Note (4) P<sub>L</sub> = I<sub>L</sub> × V<sub>L</sub>

Note (5) The lifetime of lamp can be defined as the time in which it continues to operate under the condition

Ta = 25 ± 2 °C and I<sub>L</sub> = 6 mA<sub>RMS</sub> until one of the following events occurs:

- When the brightness becomes or lower than 50% of its original value.
- When the effective ignition length becomes or lower than 80% of its original value. (Effective ignition length is defined as an area that has less than 70% brightness compared to the brightness in the center point.)

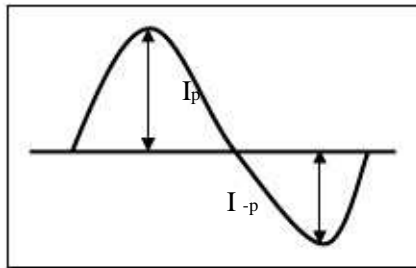
Note (6) The waveform of the voltage output of inverter must be area-symmetric and the design of the inverter must have specifications for the modularized lamp. The performance of the Backlight, such as lifetime or brightness, is greatly influenced by the characteristics of the DC-AC inverter for the lamp. All the parameters of an inverter should be carefully designed to avoid producing too much current leakage from high voltage output of the inverter. When designing or ordering the inverter please make sure that a poor lighting caused by the mismatch of the Backlight and the inverter (miss-lighting, flicker, etc.) never occurs. If the above situation is confirmed, the module should be operated in the same manners when it is installed in your instrument.

The output of the inverter must have symmetrical (negative and positive) voltage waveform and symmetrical current waveform. (Unsymmetrical ratio is less than 10%) Please do not use the inverter

which has unsymmetrical voltage and unsymmetrical current and spike wave. Lamp frequency may produce interface with horizontal synchronous frequency and as a result this may cause beat on the display. Therefore lamp frequency shall be as away possible from the horizontal synchronous frequency and from its harmonics in order to prevent interference.

Requirements for a system inverter design, which is intended to have a better display performance, a better power efficiency and a more reliable lamp. It shall help increase the lamp lifetime and reduce its leakage current.

- The asymmetry rate of the inverter waveform should be 10% below.
- The distortion rate of the waveform should be within  $\sqrt{2} \pm 10\%$ .
- The ideal sine wave form shall be symmetric in positive and negative polarities.



\* Asymmetry rate:

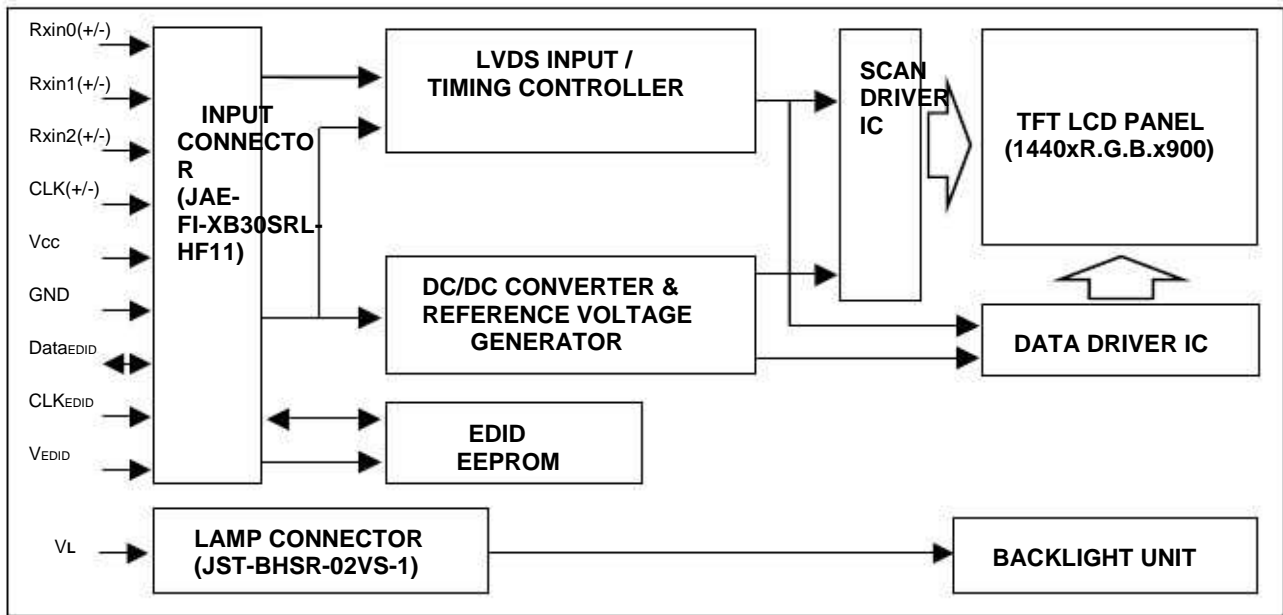
$$|I_p - I_{-p}| / I_{rms} * 100\%$$

\* Distortion rate

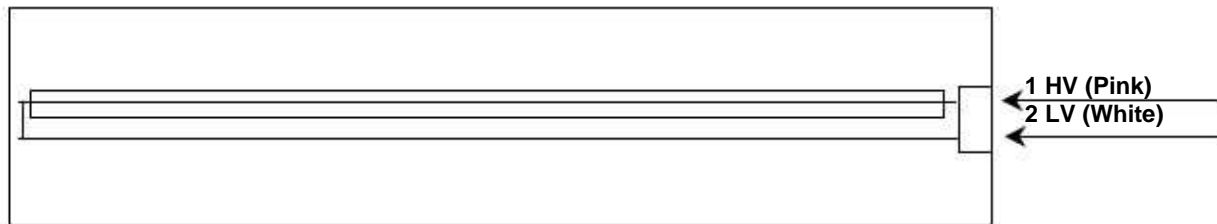
$$I_p \text{ (or } I_{-p}) / I_{rms}$$

#### 4 BLOCK DIAGRAM

##### 4.1 TFT LCD MODULE



##### 4.2 BACKLIGHT UNIT



## 5 INPUT TERMINAL PIN ASSIGNMENT

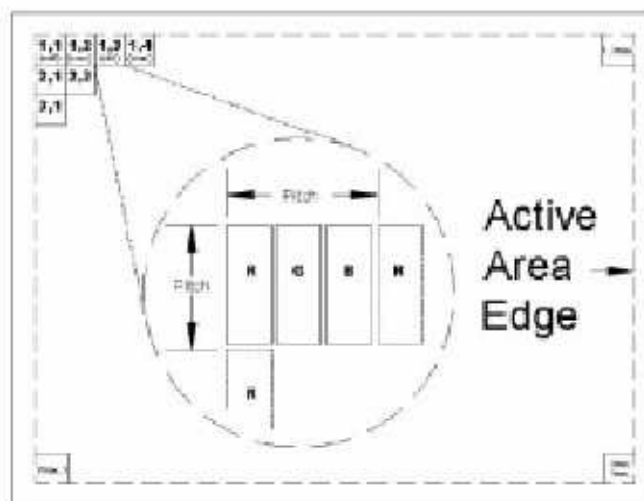
## 5.1 TFT LCD MODULE

Pin	Symbol	Description	Polarity	Remark
1	Vss	Ground		
2	Vcc	Power Supply +3.3 V (typical)		
3	VCC	Power Supply +3.3 V (typical)		
4	V <sub>EDID</sub>	DDC 3.3V Power		
5	NC	Non-Connection		
6	CLK <sub>EDID</sub>	DDC Clock		
7	DATA <sub>EDID</sub>	DDC Data		
8	RX00-	LVDS Differential Data Input (Odd)		
9	RX00+	LVDS Differential Data Input (Odd)	Negative	
10	Vss	Ground	Positive	
11	RX01-	LVDS Differential Data Input (Odd)		
12	RX01+	LVDS Differential Data Input (Odd)	Negative	
13	Vss	Ground	Positive	
14	RX02-	LVDS Differential Data Input (Odd)		
15	RX02+	LVDS Differential Data Input (Odd)	Negative	
16	Vss	Ground	Positive	
17	RX0C-	LVDS Clock Data Input (Odd)		
18	RX0C+	LVDS Clock Data Input (Odd)	Negative	
19	Vss	Ground	Positive	
20	RxE0-	LVDS Differential Data Input (Even)		
21	RxE0+	LVDS Differential Data Input (Even)	Negative	
22	Vss	Ground	Positive	
23	RxE1-	LVDS Differential Data Input (Even)		
24	RxE1+	LVDS Differential Data Input (Even)	Negative	
25	Vss	Ground	Positive	
26	RxE2-	LVDS Differential Data Input (Even)		
27	RxE2+	LVDS Differential Data Input (Even)	Negative	
28	Vss	Ground	Positive	
29	RXEC-	LVDS Clock Data Input (Even)		
30	RXEC+	LVDS Clock Data Input (Even)	Negative	
			Positive	
			Negative	
			Positive	

Note (1) Connector Part No.: JAE-FI-XB30SRL-HF11 or equivalent

Note (2) User's connector Part No: JAE-FI-X30C2L or equivalent

Note (3) The first pixel is odd as shown in the following figure.



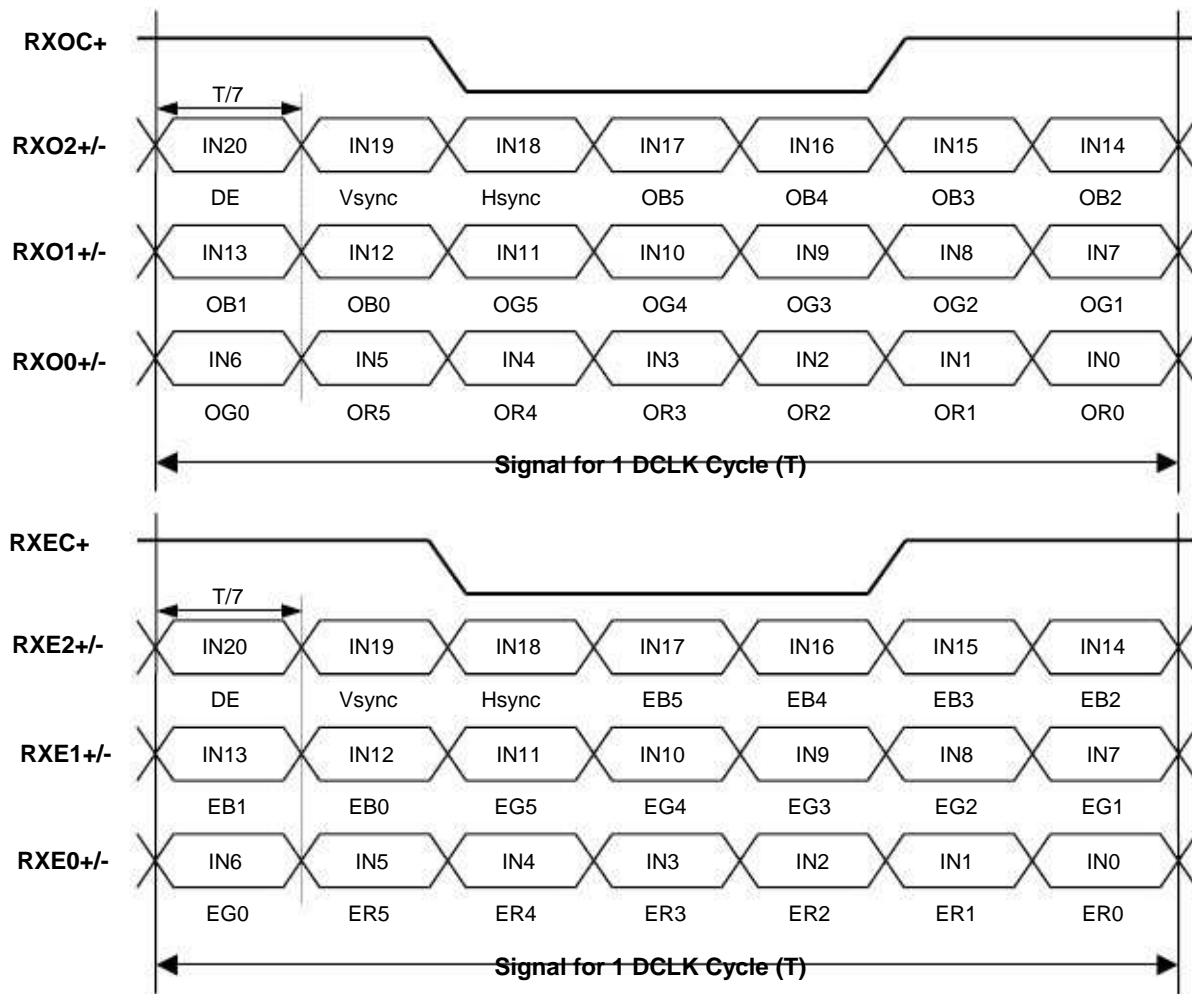
### 5.2 BACKLIGHT UNIT

Pin	Symbol	Description	Color
1	HV	High Voltage	Pink
2	LV	Ground	White

Note (1) Connector Part No.: JST- BHSR-02VS-1 or equivalent

Note (2) User's connector Part No.: SM02B-BHSS-1-TB or equivalent

### 5.3 TIMING DIAGRAM OF LVDS INPUT SIGNAL





**Approval**

### 5.4 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																	
	R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
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	0	0	0	0	0	0	0	0	0	0	0	0	0
Green	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
Basic Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
Colors 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	0	0	0	0	0	1	1	1	1	1	1	1	1
Yellow	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
Red(0)/Dark	0	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	0
Gray Red(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Scale:.....																		
Of:.....																		
Red(61)	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Red(62)	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red(63)	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green(0)/Dark	0	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	0	1	0	0	0	0	0
Gray Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Scale:.....																		
Of:.....																		
Green(61)	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0
Green(62)	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
Green(63)	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
Blue(0)/Dark	0	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	0	1
Gray Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Scale:.....																		
Of:.....																		
Blue(61)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Blue(63)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

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









90	5A	Detailed timing description # 3	00	00000000
91	5B	# 3 Flag	00	00000000
92	5C	# 3 Reserved	00	00000000
93	5D	# 3 FE (hex) defines ASCII string (Vendor "CMO", ASCII)	FE	11111110
94	5E	# 3 Flag	00	00000000
95	5F	# 3 1st character of string ("C")	43	01000011
96	60	# 3 2nd character of string ("M")	4D	01001101
97	61	# 3 3rd character of string ("O")	4F	01001111
98	62	# 3 New line character indicates end of ASCII string	0A	00001010
99	63	# 3 Padding with "Blank" character	20	00100000
100	64	# 3 Padding with "Blank" character	20	00100000
101	65	# 3 Padding with "Blank" character	20	00100000
102	66	# 3 Padding with "Blank" character	20	00100000
103	67	# 3 Padding with "Blank" character	20	00100000
104	68	# 3 Padding with "Blank" character	20	00100000
105	69	# 3 Padding with "Blank" character	20	00100000
106	6A	# 3 Padding with "Blank" character	20	00100000
107	6B	# 3 Padding with "Blank" character	20	00100000
108	6C	Detailed timing description # 4	00	00000000
109	6D	# 4 Flag	00	00000000
110	6E	# 4 Reserved	00	00000000
		# 4 FE (hex) defines ASCII string (Model Name"N141C3-L01", ASCII)		
		# 4 Flag		
		# 4 1st character of name ("N")		
		# 4 2nd character of name ("1")		
		# 4 3rd character of name ("4")		
		# 4 4th character of name ("1")		
111	6F	# 4 5th character of name ("C")	FE	11111110
112	70	# 4 6th character of name ("3")		
113	71	# 4 7th character of name (".")	00	00000000
114	72	# 4 8th character of name ("L")	4E	01001110
115	73	# 4 9th character of name ("0")	31	00110001
116	74	# 4 9th character of name ("1")	34	00110100
117	75	# 4 New line character indicates end of ASCII string	31	00110001
118	76	# 4 Padding with "Blank" character	43	01000011
119	77	# 4 Padding with "Blank" character	33	00110011
120	78	Extension flag	2D	00101101
121	79	Checksum	4C	01001100
122	7A		30	00110000
123	7B		31	00110001
124	7C		0A	00001010
125	7D		20	00100000
126	7E		20	00100000
127	7F		00	00000000
			9C	10011100

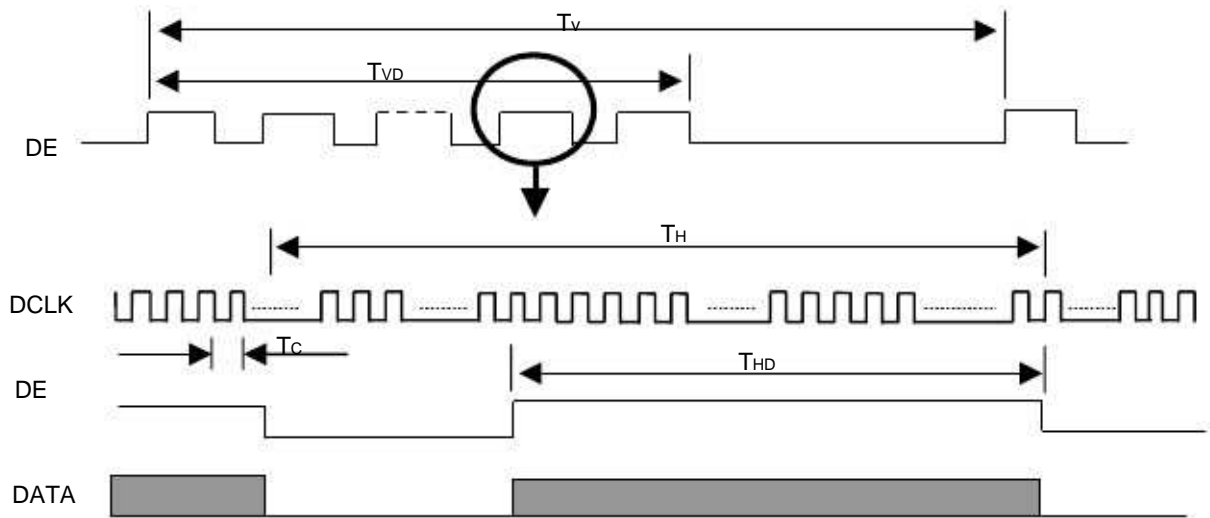
## 6 INTERFACE TIMING

### 6.1 INPUT SIGNAL TIMING SPECIFICATIONS

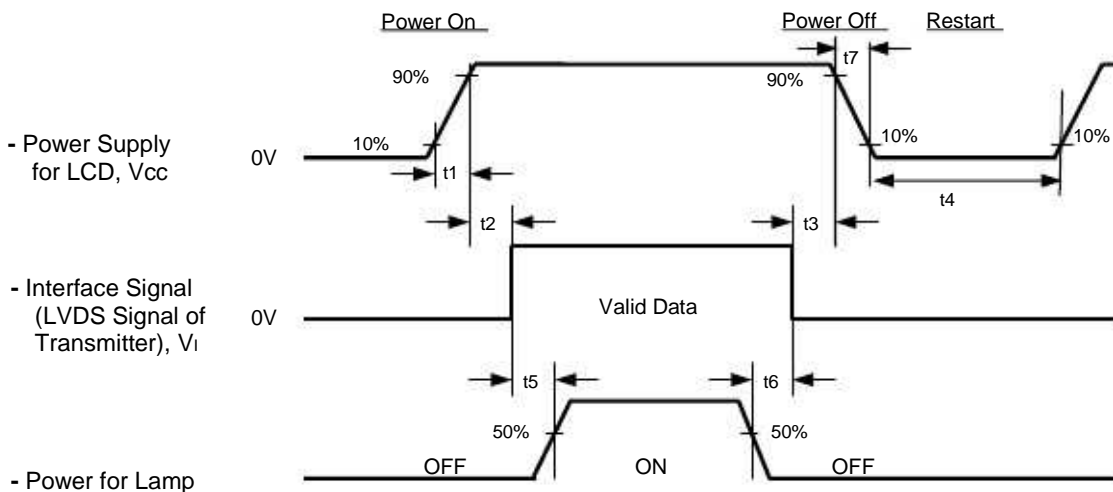
The specifications of input signal timing are as the following table and timing diagram.

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK	Frequency	1/Tc	25	44.5	60	MHz	(2)
	Vertical Total Time	TV	910	926	1500	TH	-
DE	Vertical Active Display Period	TVD	900	900	900	TH	-
	Vertical Active Blanking Period	TVB	TV-TVD	26	TV-TVD	TH	-
	Horizontal Total Time	TH	760	800	880	Tc	-
	Horizontal Active Display Period	THD	720	720	720	Tc	(2)
	Horizontal Active Blanking Period	THB		80		Tc	(2)
			TH-THD			TH-THD	(2)

**INPUT SIGNAL TIMING DIAGRAM**



### 6.2 POWER ON/OFF SEQUENCE



## Timing Specifications:

$$0.5 < t_1 \leq 10 \text{ msec}$$

$$0 < t_2 \leq 50 \text{ msec}$$

$$0 < t_3 \leq 50 \text{ msec}$$

$$t_4 \geq 500 \text{ msec}$$

$$t_5 \geq 200 \text{ msec}$$

$$t_6 \geq 200 \text{ msec}$$

Note (1) Please follow the power on/off sequence described above. Otherwise, the LCD module might be damaged.

Note (2) Please avoid floating state of interface signal at invalid period. When the interface signal is invalid, be sure to pull down the power supply of LCD Vcc to 0 V.

Note (3) The Backlight inverter power must be turned on after the power supply for the logic and the interface signal is valid. The Backlight inverter power must be turned off before the power supply for the logic and the interface signal is invalid.

Note (4) Sometimes some slight noise shows when LCD is turned off (even backlight is already off). To avoid this phenomenon, we suggest that the Vcc falling time is better to follow  $5 \leq t_7 \leq 300 \text{ ms}$ .

## 7 OPTICAL CHARACTERISTICS

## 7.1 TEST CONDITIONS

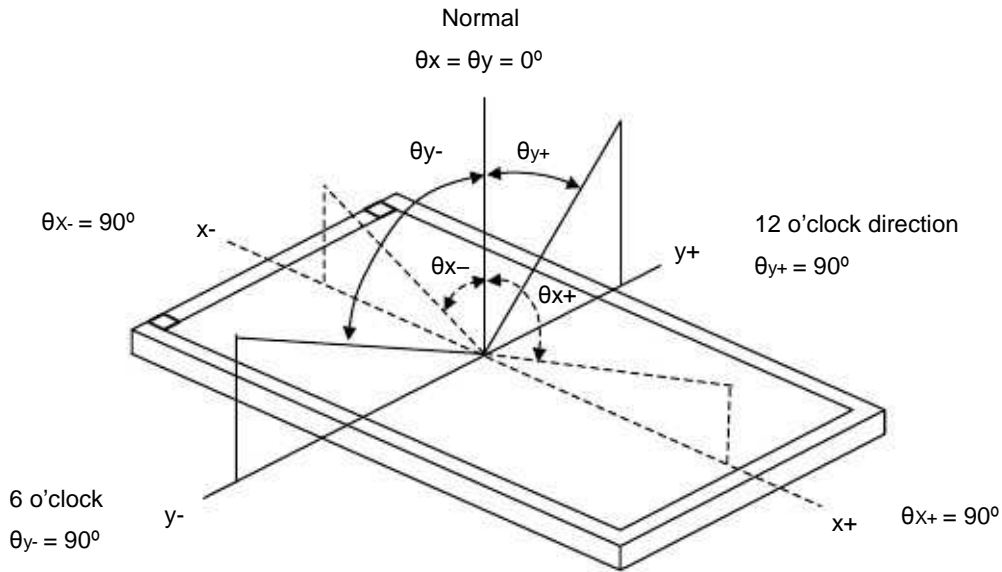
Item	Symbol	Value	Unit	
Ambient Temperature				°
Ambient Humidity	Ta	25±2		
Supply Voltage	Ha	%RH50±10		
Input Signal	Vcc	3.3V		
Inverter Current	According to typical value in "3. ELECTRICAL CHARACTERISTICS"			
Inverter Driving Frequency	Il	6.0mA		
Inverter	FL	61KHz		
Sumida H05-4915				

The relative measurement methods of optical characteristics are shown in 7.2. The following items should be measured under the test conditions described in 7.1 and stable environment shown in Note (6).

## 7.2 OPTICAL SPECIFICATIONS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Contrast Ratio		CR	$\theta_x=0^\circ; \theta_y=0^\circ$ Viewing Normal Angle	250	400	-	-	(2), (6)	
Response Time		TR		-	5	10	ms	(3)	
		TF		-	11	16	ms		
		LAVE		185	220	-	cd/m <sup>2</sup>		
Average Luminance of White									(4), (6)
White Variation		$\delta W$ 5pts			-	-	1.4	-	(6)
Color Chromaticity	Red	Rx		$\theta_x=0^\circ; \theta_y=0^\circ$ Viewing Normal Angle	TYP -0.03	0.590	TYP +0.03	-	(1), (6)
		Ry				0.340		-	
	Green	Gx				0.319		-	
		Gy				0.541		-	
		Bx	0.152			-			
	Blue	By	0.125			-			
		Wx	0.313			-			
	White	Wy	0.329			-			
		45	-						
Viewing Angle	Horizontal	$\theta_{x+}$	CR≥10	40	20	-	Deg.		
		$\theta_{x-}$		40	45	-			
		$\theta_{y+}$		15	-	-			
	Vertical	$\theta_{y-}$		40	-	-			

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.

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

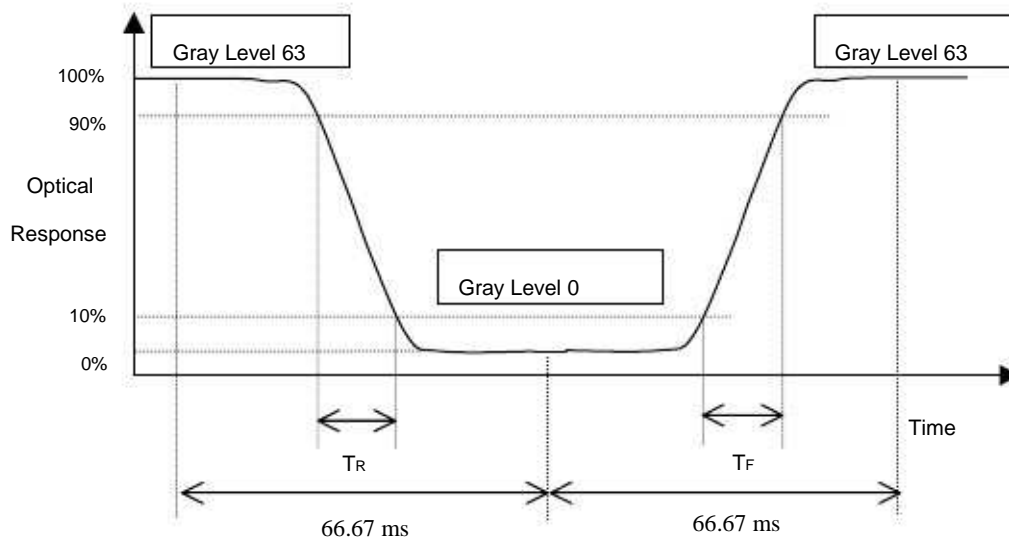
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

$$\text{CR} = \text{CR} (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

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

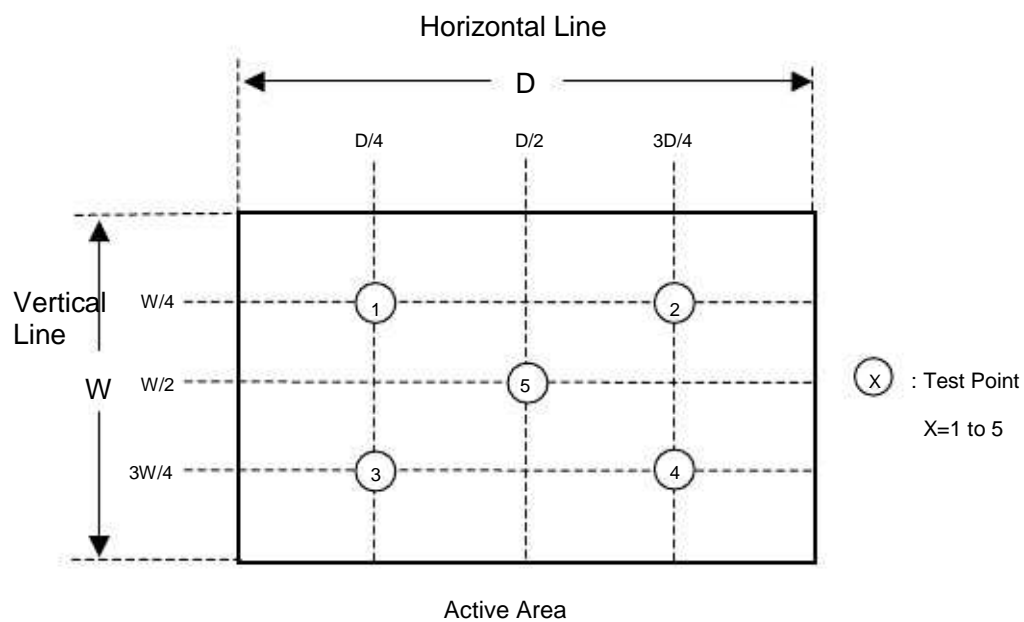
$$L_{AVE} = [L(1) + L(2) + L(3) + L(4) + L(5)] / 5$$

$L(x)$  is corresponding to the luminance of the point X at Figure in Note (5)

Note (5) Definition of White Variation ( $\delta W$ ):

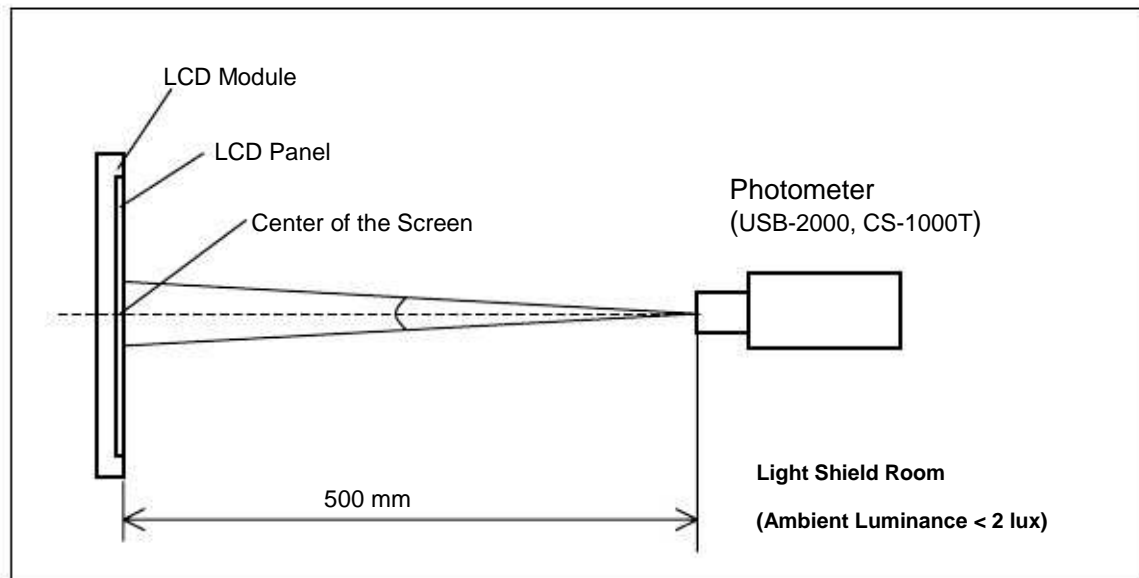
Measure the luminance of gray level 63 at 5 points

$$\delta W = \text{Maximum} [L(1), L(2), L(3), L(4), L(5)] / \text{Minimum} [L(1), L(2), L(3), L(4), L(5)]$$



**Note (6) 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.



## 8 PRECAUTIONS

### 8.1 ASSEMBLY AND 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 lamp wire.
- (11) Pins of I/F connector should not be touched directly with bare hands.

### 8.2 SAFETY 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 lamp 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 inverter. Do not disassemble the module or insert anything into the Backlight unit.



9 PACKAGING  
 9.1 CARTON

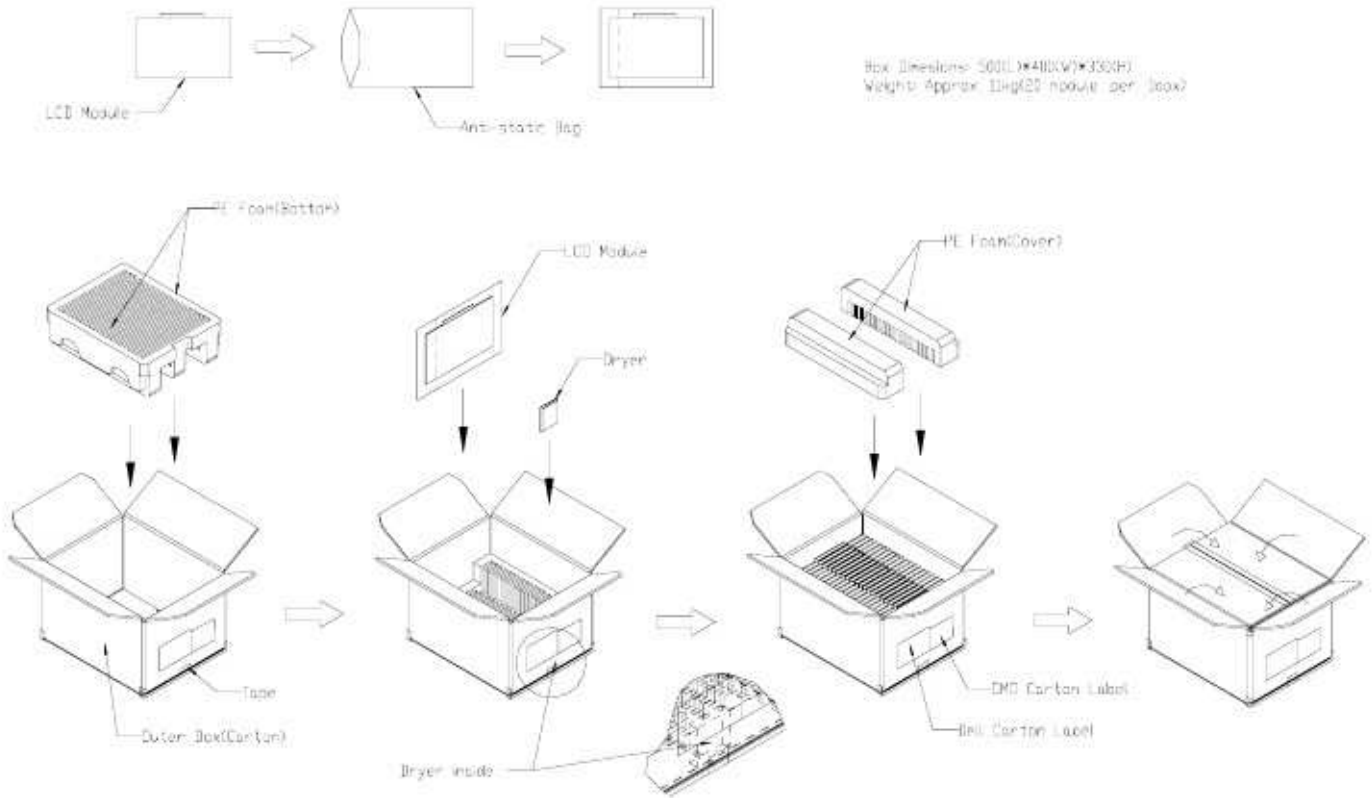
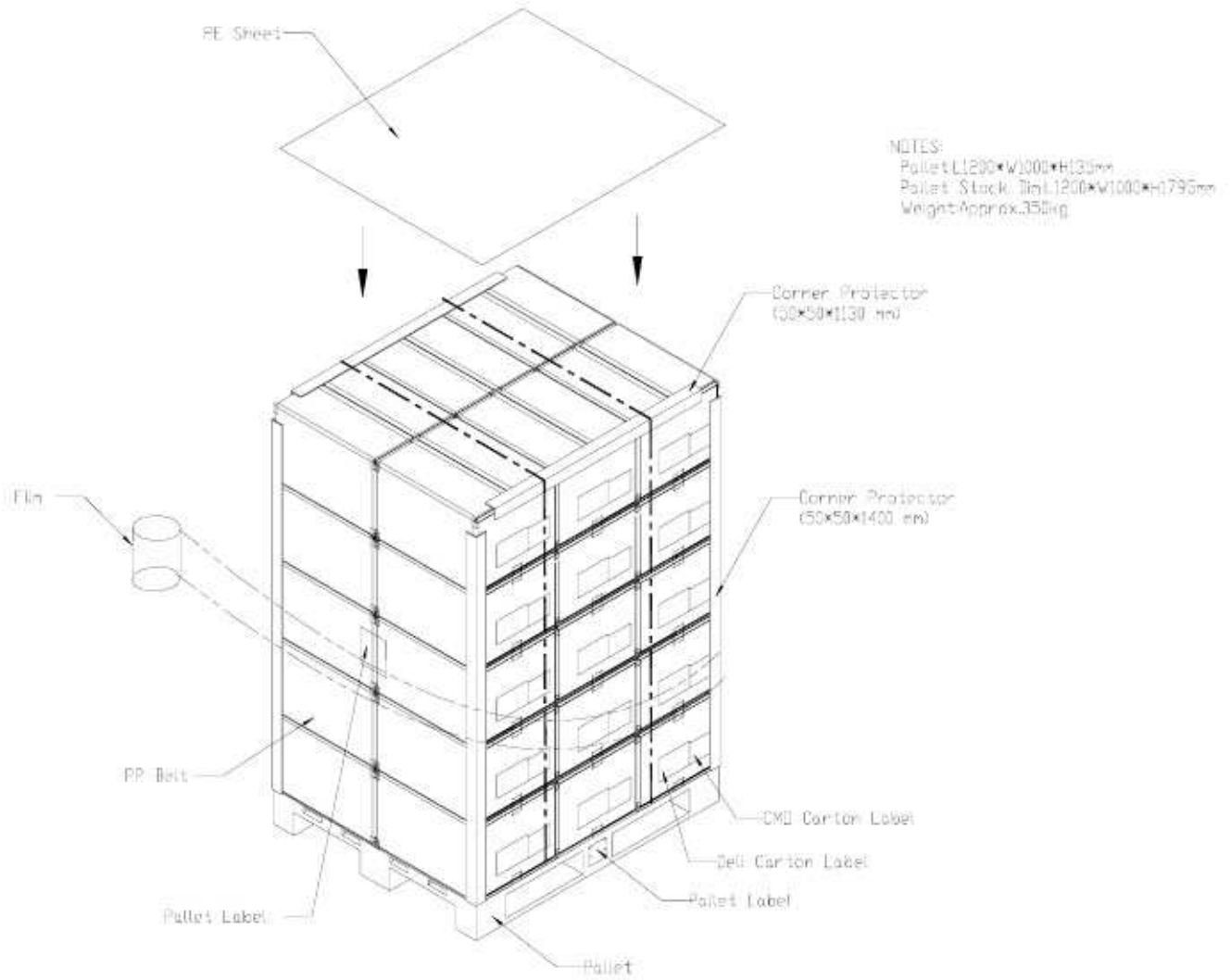


Figure. 9-1 Packing method

9.2 PALLET FOR SEA FREIGHT



**Figure. 9-2 Packing method**

9.3 PALLET FOR AIR FREIGHT

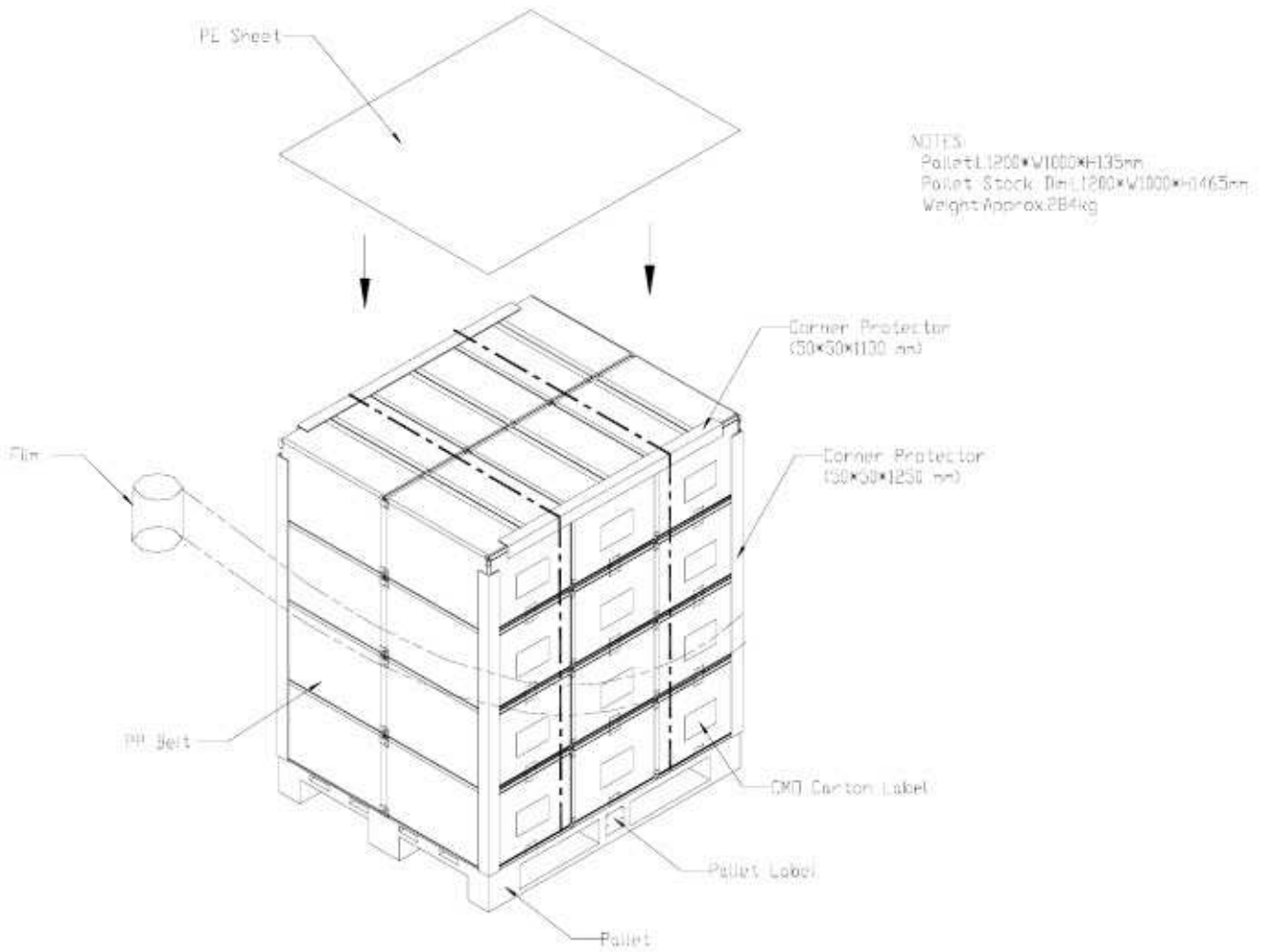


Figure. 9-3 Packing method

10 DEFINITION OF LABELS

10.1 CMO MODULE LABEL

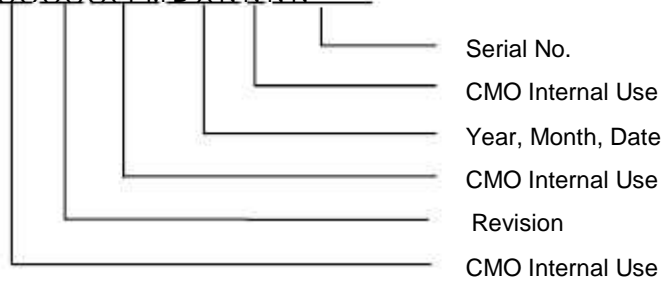
The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



(a) Model Name: N141C3 - L01

(b) Revision: Rev. XX, for example: A1, ..., C1, C2 ...etc.

(c) Serial ID: X X X X X X X Y M D X N N N N



(d) Production Location: MADE IN XXXX. XXXX stands for production location.

(e) LEOO: UL compliance remarks for CMO NingBo site production. It won't be available when production location isn't CMO NingBo.

Serial ID includes the information as below:

(a) Manufactured Date: Year: 1~9, for 2001~2009

Month: 1~9, A~C, for Jan. ~ Dec.

Day: 1~9, A~Y, for 1st to 31st, exclude I , O and U

(b) Revision Code: cover all the change

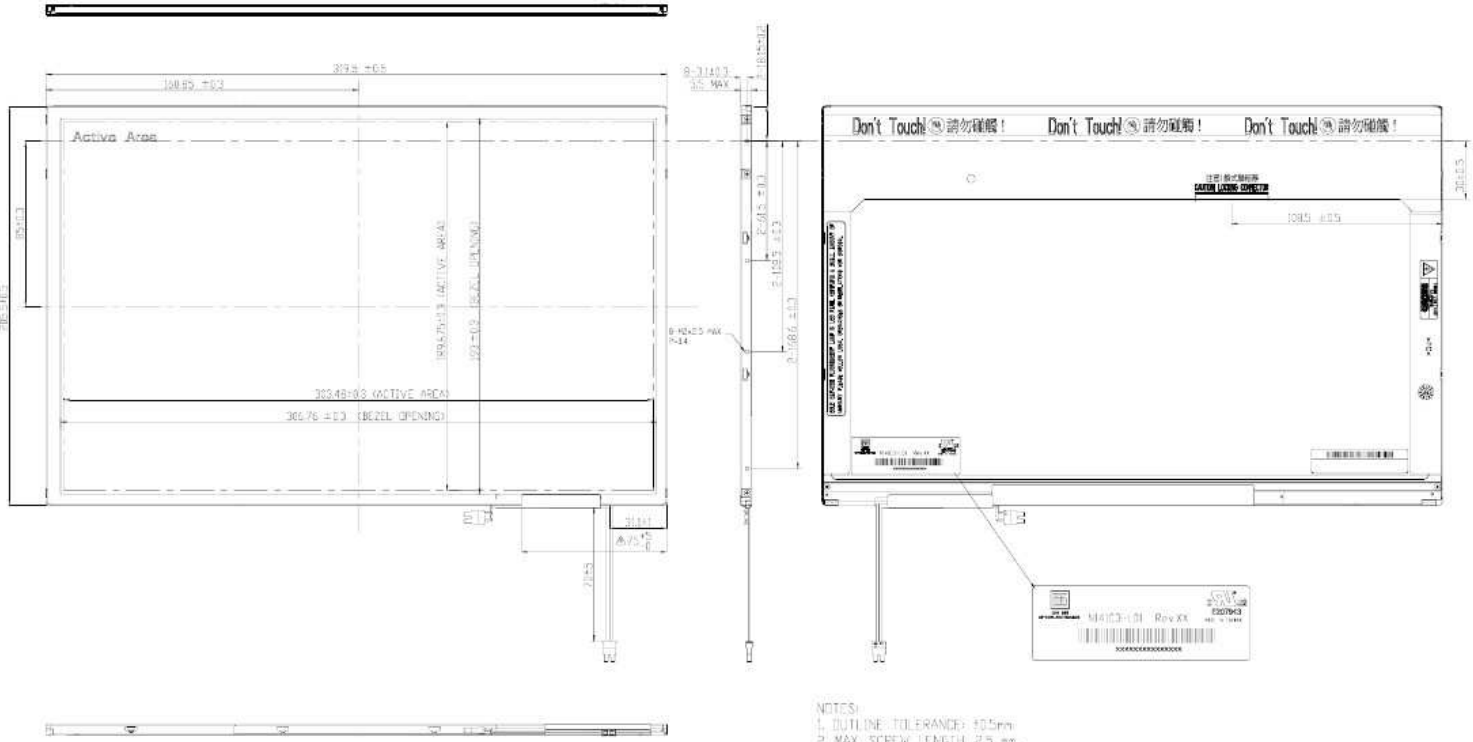
(c) Serial No.: Manufacturing sequence of product

10.2 CMO CARTON LABEL



The image shows a rectangular label for a CMO carton. At the top left is the CHI MEI logo (a square with 'm' inside) and the text 'CHI MEI OPTOELECTRONICS'. Below this are four horizontal lines for input: 'PO. NO.', 'Part ID.', 'Model Name', and 'Carton ID.'. To the right of the 'Carton ID.' line is the word 'Quantities'. In the center, the letters 'CMO' are printed in a large, light blue, stylized font. At the bottom, it says 'Made in XXXX' and has a circular 'GP' logo with 'RoHS' written below it.

(a) Production location: Made In XXXX. XXXX stands for production location.



- NOTES:
1. OUTLINE TOLERANCE: ±0.5mm
  2. MAX. SCREW LENGTH: 2.5 mm
  3. MAX. SCREW TORQUE: 2.0 kgf-cm
  4. SIGNAL INTERFACE CONNECTOR: F1-XR30SRL-HF11 (JAE)
  5. CCL CONNECTOR: BHSR-02VS-1 (JST)

Check	Maker	Part Name	Rev	Drawn	Checked	DATE

FILE NO.	REV.	DATE
M1013-01	Rev XX	