CHI MEI
OPTOELECTRONICS CORP.

TFT LCD Approval Specification

MODEL NO.: G121X1-L03

Customer:
Approved by:
Note:

2010-02-22 19:02:25	APPL	(yhchang)	Director	Accept

Version 2.0

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REVISION HISTORY

Version	Date	Section	Description
2.0	Jan 22, 2010	All	G121X1-L03 Approval Spec. was first issued

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1. GENERAL DESCRIPTION

1.1 OVERVIEW

The G121X1-L03 model is a 12.1" TFT-LCD module with a white LED Backlight Unit and a 20-pin 1ch-LVDS interface. This module supports 1024 x 768 XGA mode and displays 262k/16.2M colors. The converter for the Backlight Unit is built in.

1.2 FEATURES

- Wide viewing angle
- High contrast ratio
- Fast response time
- XGA (1024 x 768 pixels) resolution
- Wide operating temperature
- DE (Data Enable) mode
- LVDS (Low Voltage Differential Signaling) interface
- Reversible-scan direction
- RoHS Compliance
- Lamp Replaceable

1.3 APPLICATION

- TFT LCD Monitor
- Industrial Application
- Amusement
- Vehicle

1.4 GENERAL SPECIFICATI0NS

Item	Specification	Unit	Note
Diagonal Size	12.1	inch	
Active Area	245.76(H) x 184.32(V)	mm	(1)
Bezel Opening Area	249.0 x 187.5	mm	
Driver Element	a-si TFT active matrix	-	-
Pixel Number	1024 x R.G.B. x 768	pixel	-
Pixel Pitch	0.240(H) x 0.240(V)	mm	-
Pixel Arrangement	RGB vertical stripe	-	-
Display Colors	262k/16.2M	color	-
Transmissive Mode	Normally white	-	-
Surface Treatment	Hard coating (3H), Glare	-	-
Module Power Consumption	11.8 (Black pattern)	W	Typ.

1.5 MECHANICAL SPECIFICATIONS

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	260.2	260.5	260.8	mm	(1)
	Vertical (V)	239.7	204	204.3	mm	
	Depth (D)	7.9	8.4	8.9	mm	
Weight			510	540	g	-
I/F connector mounting position		The mounting inclination of the connector makes the screen center within ±0.5mm as the horizontal.			-	(2)

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

(2) Connector mounting position

+/- 0.5mm

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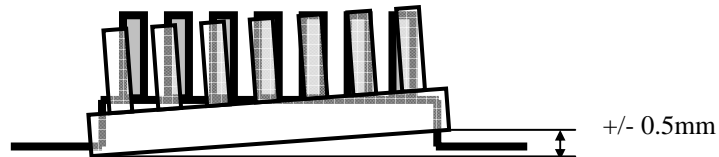
2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Operating Ambient Temperature	T_{OP}	-30	+80	ºC	
Storage Temperature	T_{ST}	-40	+85	ºC	

Note (1) Temperature and relative humidity range is shown in the figure below.

(2) 90 %RH Max. (Ta   40 ºC).

(3) Wet-bulb temperature should be 39 ºC Max. (Ta > 40 ºC).

(4) No condensation.

Relative Humidity (%RH)

Temperature (ºC)

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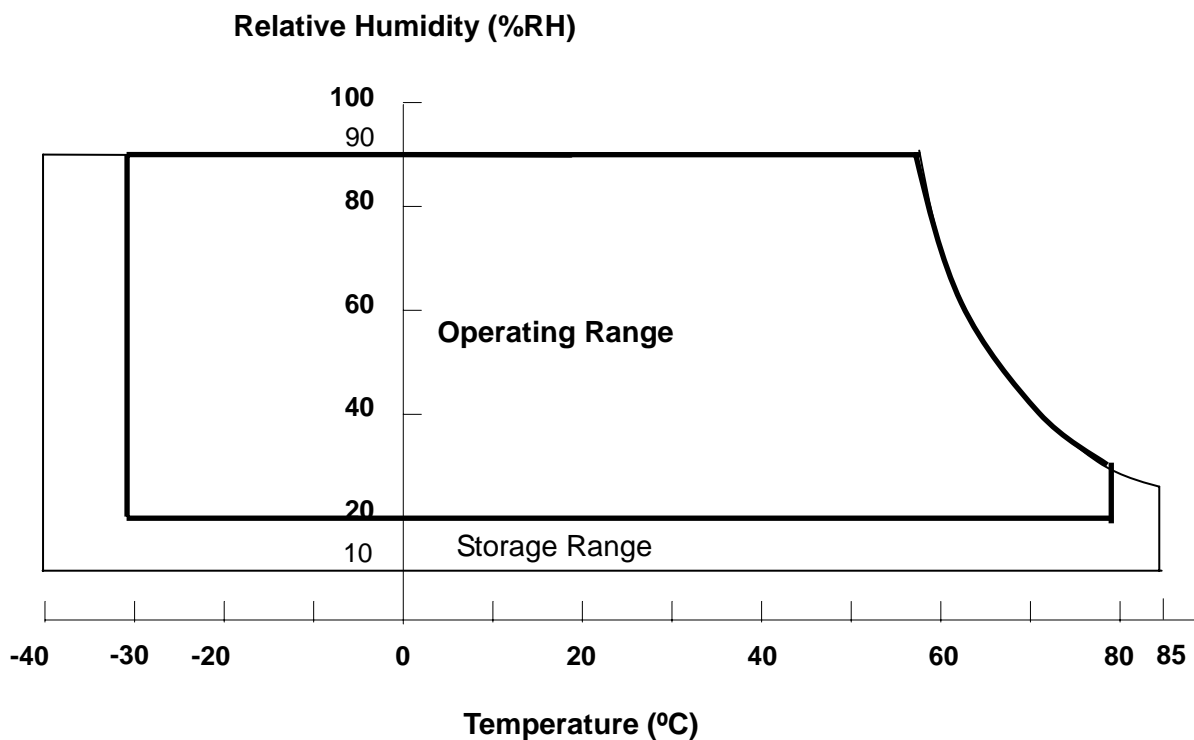
2.2 ELECTRICAL ABSOLUTE RATINGS

2.2.1 TFT LCD MODULE

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	VCC	-0.3	7	V	(1)

2.2.2 BACKLIGHT UNIT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Converter Voltage	V_i	-0.3	18	V	(1) , (2)
Enable Voltage	EN	---	5.5	V	
Backlight Adjust	ADJ	---	5.5	V	

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).

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3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD MODULE

Ta = 25 ± 2 ºC

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V_{CC}	3.0	3.3	3.6	V	(1) at Vcc=3.3V
			4.75	5.0	5.25	V	(1) at Vcc=5.0V
Rush Current		I_{RUSH}	-	-	4	A	(2)
Power Supply Current	White	-	-	410	490	mA	(3)a, at Vcc=3.3V
			-	320	395	mA	(3)a, at Vcc=5.0V
	Black		-	540	650	mA	(3)b, at Vcc=3.3V
			-	400	480	mA	(3)b, at Vcc=5.0V
Power Consumption		P_L	-	2.0	-	W	
LVDS differential input voltage		|VID|	100	-	600	mV	
LVDS common input voltage		VICM	0.7	-	1.6	V	

Note (1) The assembly should be always operated within above ranges.

Note (2) Measurement Conditions:

Vcc rising time is 470μs

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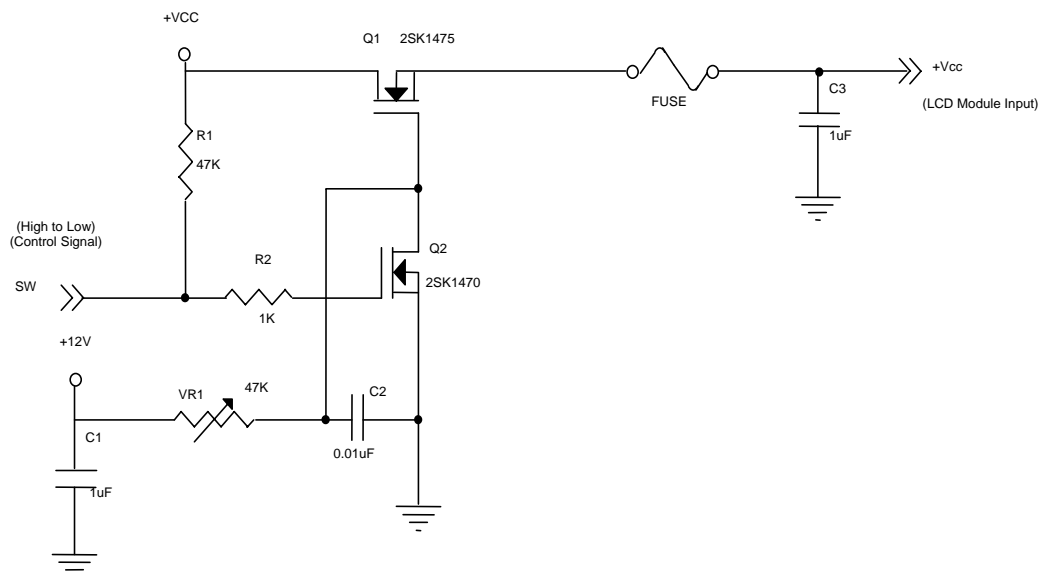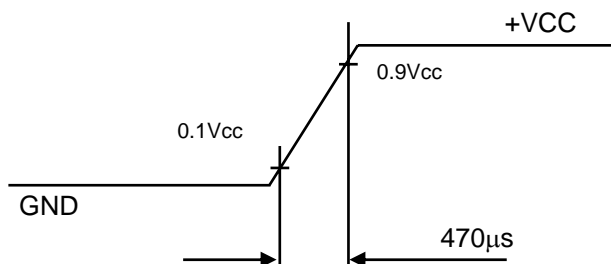
Note (3) The specified power supply current is under the conditions at Vcc = 3.3V or 5V, Ta = 25 ± 2 ºC, f_v

= 60 Hz, whereas a power dissipation check pattern below is displayed.

a. White Pattern

b. Black Pattern

Active Area

Active Area

3.2 BACKLIGHT UNIT
Ta = 25 ± 2 ºC

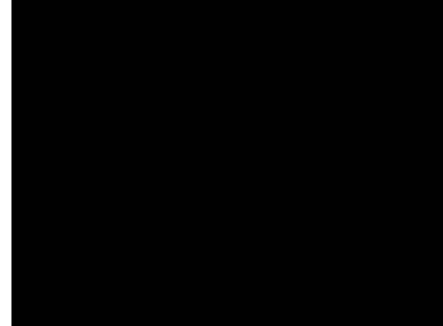| Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Converter Power Supply Voltage		V_i	7	12.0	17	V	
Converter Power Supply Current		I_i	0.7	0.83	0.9	A	@ Vi = 12V (Duty 100%)
LED Power Consumption		P_{LED}	-	10	-	W	@ Vi = 12V (Duty 100%)
EN Control Level	Backlight on	-	2.0	3.3	5.0	V	
	Backlight off		0	---	0.8	V	
PWM Control Level	PWM High Level	-	2.0	3.3	5.0	V	
	PWM Low Level		0	-	0.15	V	
PWM Control Duty Ratio		-	10	-	100	%	
PWM Control Frequency		f_{PWM}	190	200	210	Hz	
LED Life Time		L_L	50,000	-	-	Hrs	(2)

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

Note (2) The lifetime of LED is defined as the time when it continues to operate under the conditions at

Ta = 25 ±2   and Duty 100% until the brightness becomes   50% of its original value.

Input Power
Pi

Power Supply

Vi. Ii

GND

Converter

LED
Backlight
Unit

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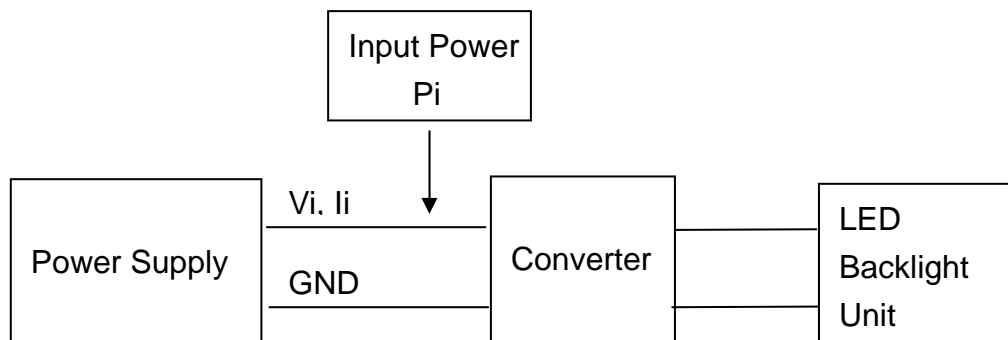
4. BLOCK DIAGRAM

4.1 TFT LCD MODULE

5. INPUT TERMINAL PIN ASSIGNMENT

5.1 TFT LCD MODULE

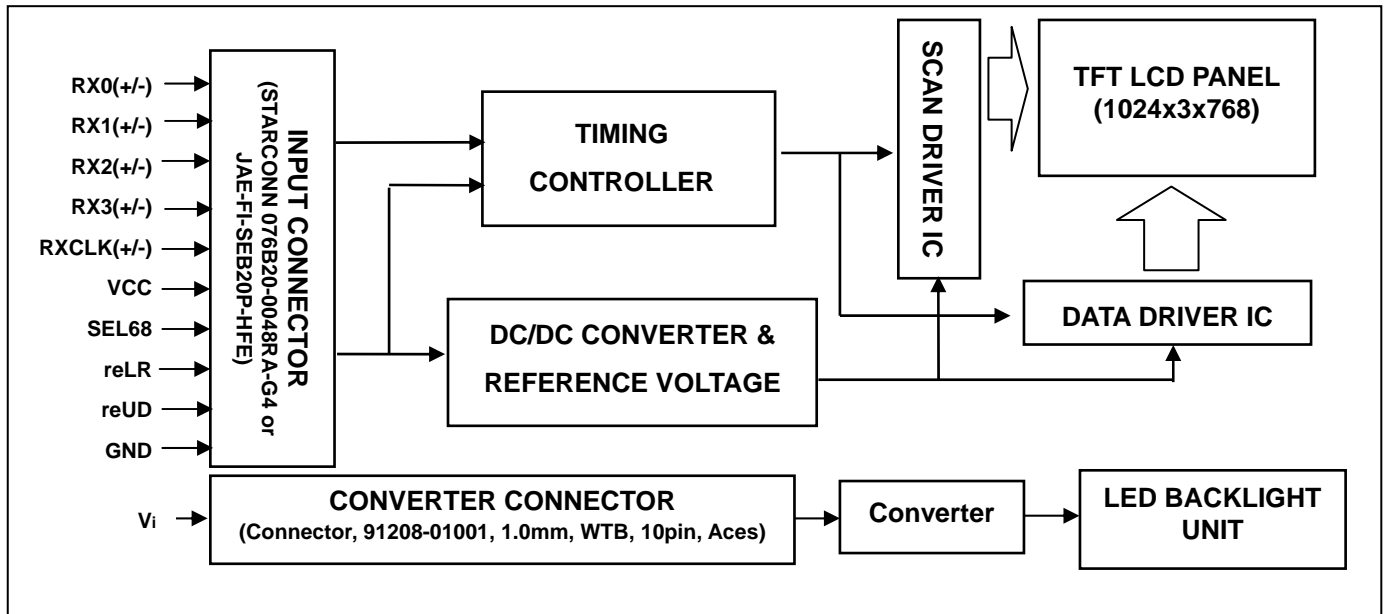| Pin	Name	Description	Remark
1	RX3+	Differential Data Input, CH3 (Positive)	
2	RX3-	Differential Data Input, CH3 (Negative)	
3	NC	NC	
4	SEL68	LVDS 6/8 bit select function control, Low or NC → 6 bit Input Mode High → 8bit Input Mode	Note (3)
5	GND	Ground	
6	RXC+	Differential Clock Input (Positive)	
7	RXC-	Differential Clock Input (Negative)	
8	GND	Ground	
9	RX2+	Differential Data Input , CH2 (Positive)	
10	RX2-	Differential Data Input , CH2 (Negative)	
11	GND	Ground	
12	RX1+	Differential Data Input , CH1 (Positive)	
13	RX1-	Differential Data Input, CH1 (Negative)	
14	GND	Ground	
15	RX0+	Differential Data Input, CH0 (Positive)	
16	RX0-	Differential Data Input, CH0 (Negative)	
17	reLR	Horizontal Reverse Scan Control, Low or NC → Normal Mode. High → Horizontal Reverse Scan	Note (3)
18	reUD	Vertical Reverse Scan Control, Low or NC → Normal Mode, High → Vertical Reverse Scan	Note (3)
19	VCC	Power supply	
20	VCC	Power supply	

Note (1) Connector Part No.: STARCONN 076B20-0048RA-G4 or JAE FI-SEB20P-HFE or equivalent.

Note (2) User's connector Part No.: JAE FI-SE20ME or equivalent.

Note (3) "Low" stands for 0V. "High" stands for 3.3V. "NC" stands for "No Connected".

5.2 BACKLIGHT UNIT(Converter connector pin)

Pin	Symbol	Description	Remark
1	V_i	Converter input voltage	12V
2	V_i	Converter input voltage	12V
3	V_i	Converter input voltage	12V
4	V_i	Converter input voltage	12V
5	V_{GND}	Converter ground	Ground
6	V_{GND}	Converter ground	Ground
7	V_{GND}	Converter ground	Ground
8	V_{GND}	Converter ground	Ground
9	EN	Enable pin	3.3V
10	ADJ	Backlight Adjust	PWM Dimming (190-210Hz, Hi: $3.3V_{DC}$, Lo: $0V_{DC}$)

Note (1) Connector Part No.: 91208-01001-H01 (ACES) or equivalent.

Note (2) User's connector Part No.: 91209-01011 (ACES) or equivalent

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5.3 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	0
	Red(1)	0	0	0	0	0	1	0	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	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	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	1	0	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	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	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	1	0	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	0
	Green(62)	0	0	0	0	0	0	1	1	1	1	1	0	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	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	0
	Blue(1)	0	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	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

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

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The brightness of each primary color (red, green and blue) is based on the 8-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							
		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
	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
	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
	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
	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
	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	Red(0) / Dark	0	0	0	0	0	0	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	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	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(255)	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	Green(0)/ Dark	0	0	0	0	0	0	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	0	0	0	1	0	0	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	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(255)	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	Blue(0) / Dark	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(1)	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(254)	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(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

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

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6. INTERFACE TIMING

### 6.1 INPUT SIGNAL 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	Fc	57.5	64.9	74.4	MHz	
Vertical Active Display Term	Total	Tv	774	806	848	Th	Tv=Tvd+Tvb
	Display	Tvd	-	768	-	Th	-
	Blank	Tvb	6	38	80	Th	-
Horizontal Active Display Term	Total	Th	1240	1344	1464	Tc	Th=Thd+Thb
	Display	Thd	-	1024	-	Tc	-
	Blank	Thb	216	320	440	Tc	-

Note (1) Since this assembly is operated in DE only mode, Hsync and Vsync input signals should be set to

low logic level. Otherwise, this assembly would operate abnormally.

(2) Frame rate is 60Hz

INPUT SIGNAL TIMING DIAGRAM

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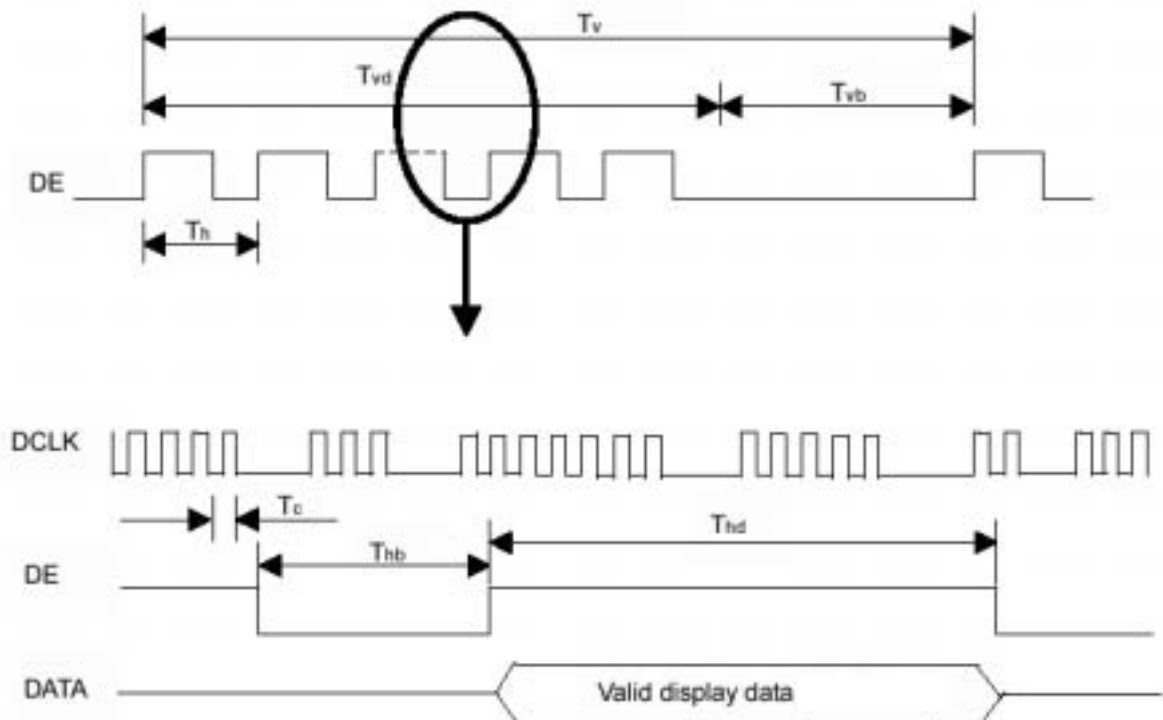
6.2 POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of LCD assembly, the power on/off sequence should be as the diagram below.
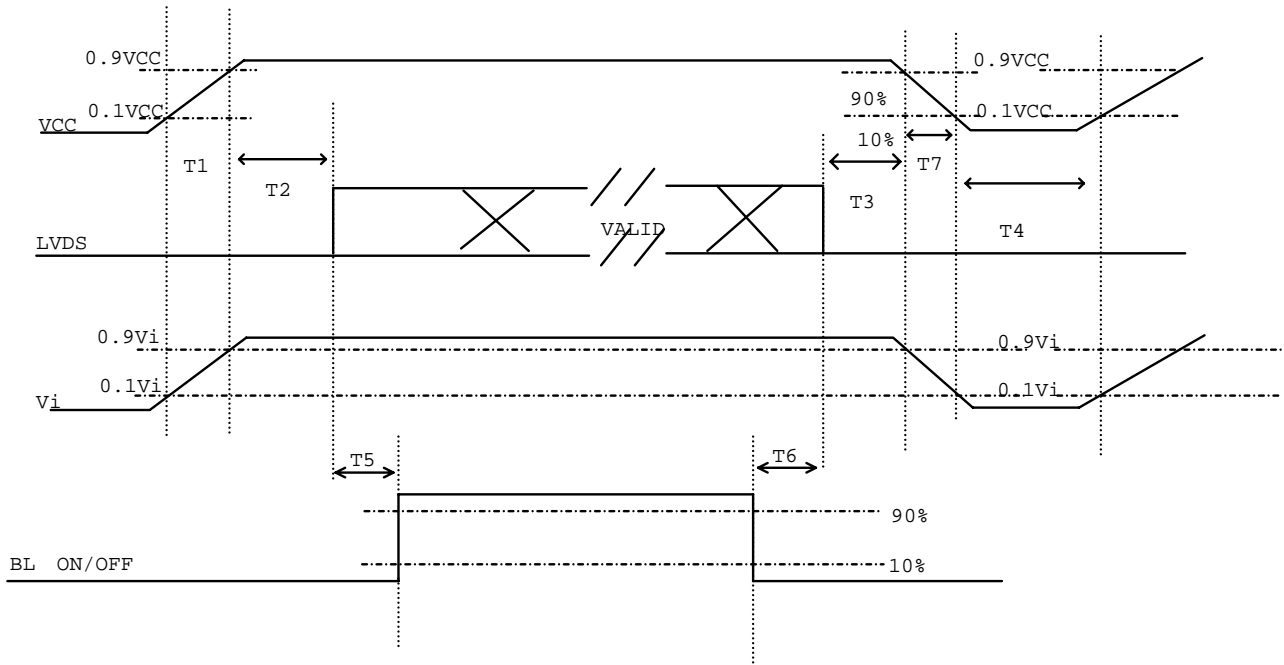
Power ON/OFF sequence

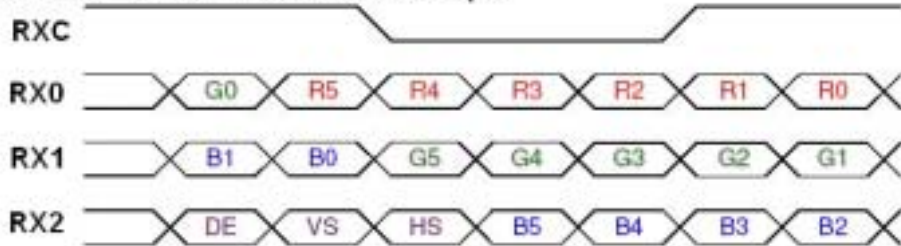Note (1) Please avoid floating state of interface signal at invalid period.

Note (2) When the interface signal is invalid, be sure to pull down the power supply of LCD VCC to 0 V.

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

Parameter	Value			Units
	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	5	-	300	ms

6.3 The Input Data Format

SEL68 = "Low" or "NC" for 6 bits LVDS Input

RXC

RX0		G0	R5	R4	R3	R2	R1	R0	
RX1		B1	B0	G5	G4	G3	G2	G1	
RX2		DE	VS	HS	B5	B4	B3	B2	

SEL68 = "High" for 8 bits LVDS Input

RXC

RX0		G0	R5	R4	R3	R2	R1	R0	
RX1		B1	B0	G5	G4	G3	G2	G1	
RX2		DE	VS	HS	B5	B4	B3	B2	
RX3		RSV	B7	B6	G7	G6	R7	R6	
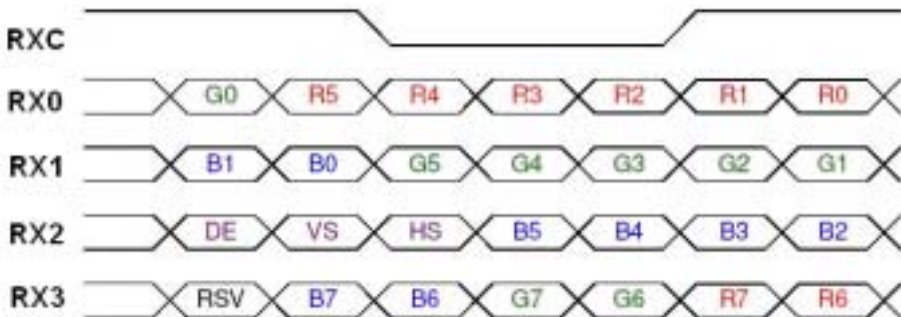
Note (1) R/G/B data 7: MSB, R/G/B data 0: LSB

Note (2) Please follow PSWG

Signal Name	Description	Remark
R7	Red Data 7 (MSB)	Red-pixel Data
R6	Red Data 6	Each red pixel's brightness data consists of these
R5	Red Data 5	8 bits pixel data.
R4	Red Data 4	
R3	Red Data 3	
R2	Red Data 2	
R1	Red Data 1	
R0	Red Data 0 (LSB)	
G7	Green Data 7 (MSB)	Green-pixel Data
G6	GreenData 6	Each green pixel's brightness data consists of these
G5	GreenData 5	8 bits pixel data.
G4	GreenData 4	
G3	GreenData 3	
G2	GreenData 2	
G1	GreenData 1	
G0	GreenData 0 (LSB)	
B7	Blue Data 7 (MSB)	Blue-pixel Data
B6	Blue Data 6	Each blue pixel's brightness data consists of these
B5	Blue Data 5	8 bits pixel data.
B4	Blue Data 4	
B3	Blue Data 3	
B2	Blue Data 2	
B1	Blue Data 1	
B0	Blue Data 0 (LSB)	
RXCLKIN+ RXCLKIN-	LVDS Clock Input	
DE	Display Enable	
VS	Vertical Sync	
HS	Horizontal Sync	

Note (3) Output signals from any system shall be low or Hi-Z state when VCC is off.

6.4 Scanning Direction

The following figures show the image see from the front view. The arrow indicates the direction of scan.

Fig.1 Normal Scan   **Fig.2 Reverse Scan**

Fig.3 Reverse Scan   **Fig.4 Reverse Scan**

Fig. 1   Normal scan (pin 17, reLR = Low or NC, pin 18, reUD = Low or NC)

Fig. 2   Reverse scan (pin 17, reLR = High, pin 18, reUD = Low or NC)

Fig. 3   Reverse scan (pin 17, reLR = Low or NC, pin 18, reUD = High)

Fig. 4   Reverse scan (pin 17, reLR = High, pin 18, reUD = High)

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Approval

7. OPTICAL CHARACTERISTICS

7.1 TEST CONDITIONS

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	^{o}C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	V_{CC}	3.3	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
Converter Voltage	V_{in}	12	V
Converter Duty		100%	

7.2 OPTICAL SPECIFICATIONS

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 (5).

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color Chromaticity	Red	Rx	$\theta_x=0°$, $\theta_Y=0°$ CS-1000	Typ - 0.05	0.625	Typ + 0.05	-	(1), (5)
		Ry			0.358		-	
	Green	Gx			0.324		-	
		Gy			0.604		-	
	Blue	Bx			0.144		-	
		By			0.088		-	
	White	Wx			0.313		-	
		Wy			0.329		-	
Center Luminance of White		L_C		500	600	-	-	(4), (5)
Contrast Ratio		CR		500	700	-	-	(2), (5)
Contrast Ratio in daylight			Sun lamp	100	120	-	-	(7)
Response Time		T_R	$\theta_x=0°$, $\theta_Y=0°$	-	5	10	ms	(3)
		T_F		-	11	16	ms	
White Variation		δW	$\theta_x=0°$, $\theta_Y=0°$	-	1.25	1.4	-	(5), (6)
Viewing Angle	Horizontal	θ_x+	CR≥10	70	80	-	Deg.	(1), (5)
		θ_x-		70	80	-		
	Vertical	θ_Y+		60	70	-		
		θ_Y-		60	70	-		

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Note (1) Definition of Viewing Angle (θx, θy):
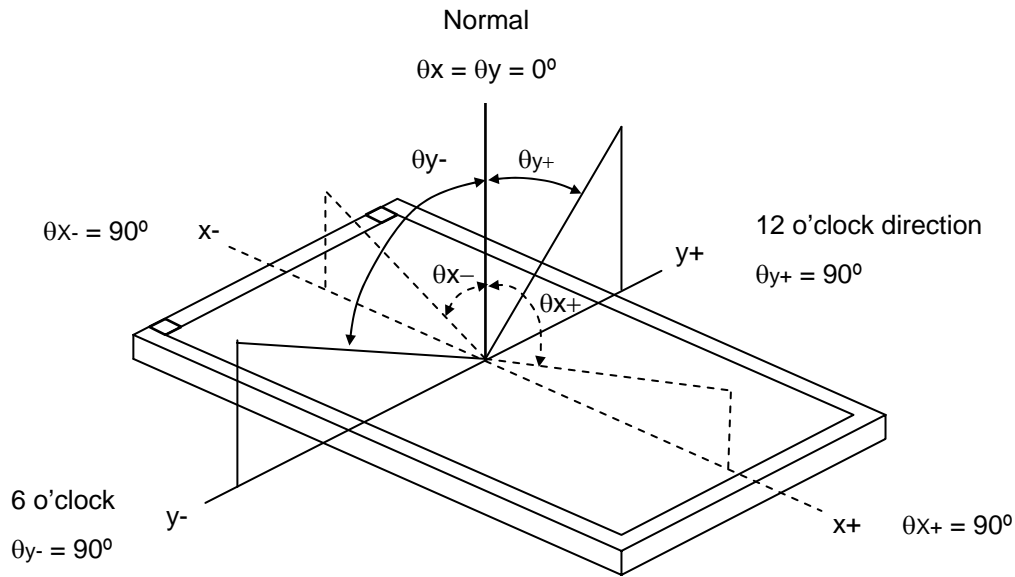
Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.
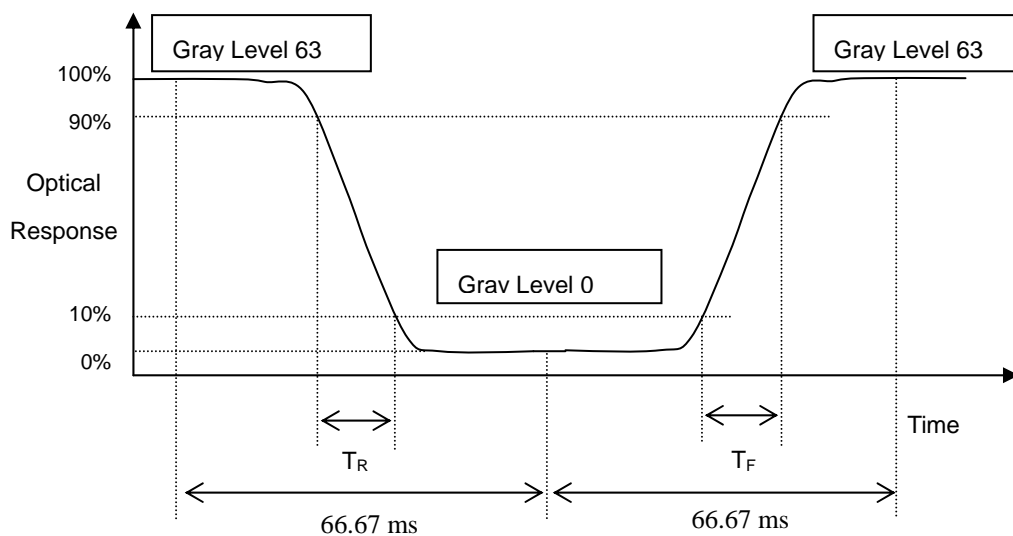
Contrast Ratio (CR) = L63 / L0

L63: Luminance of gray level 63

L 0: Luminance of gray level 0

CR = CR (5)

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) and measurement method:

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Note (4) Definition of Luminance of White (L_C):

Measure the luminance of gray level 63 at center point

$L_C = L (5)$

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.

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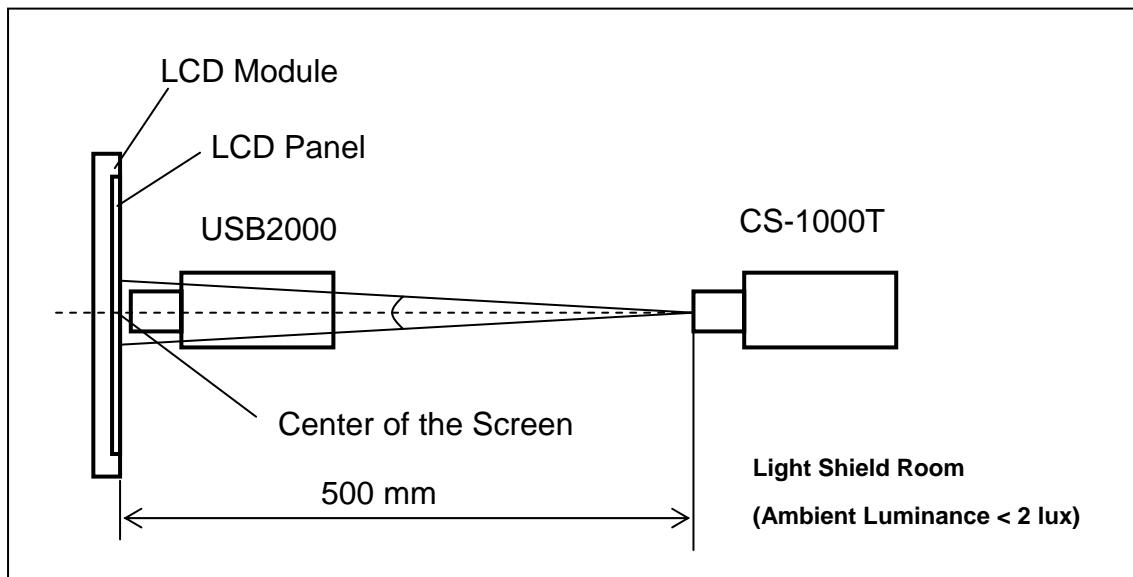
Note (6) Definition of White Variation (δW):

Measure the luminance of gray level 63 at 5 points

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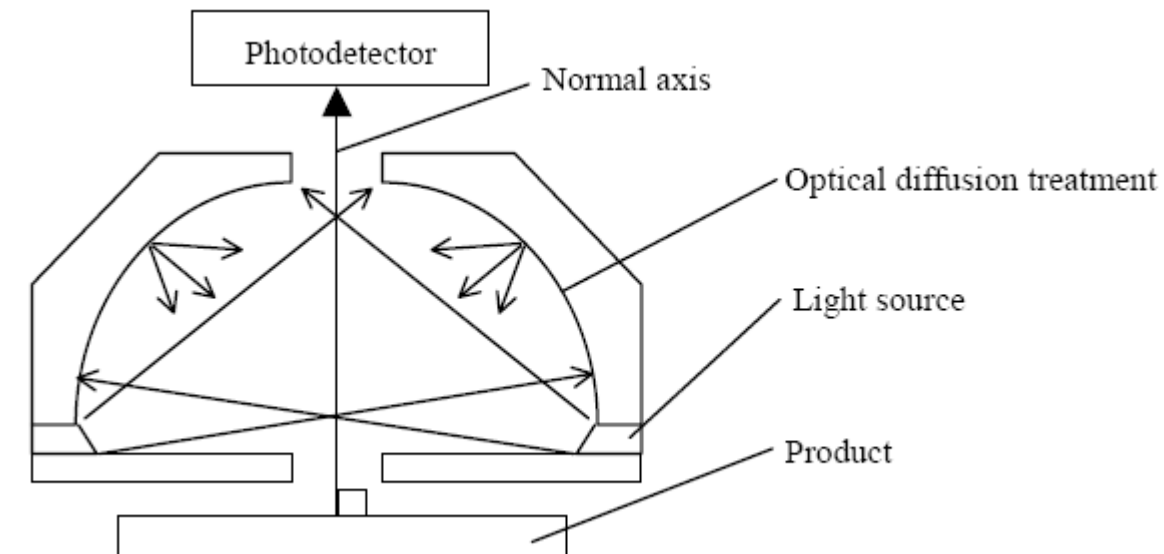
Horizontal Line

Active Area
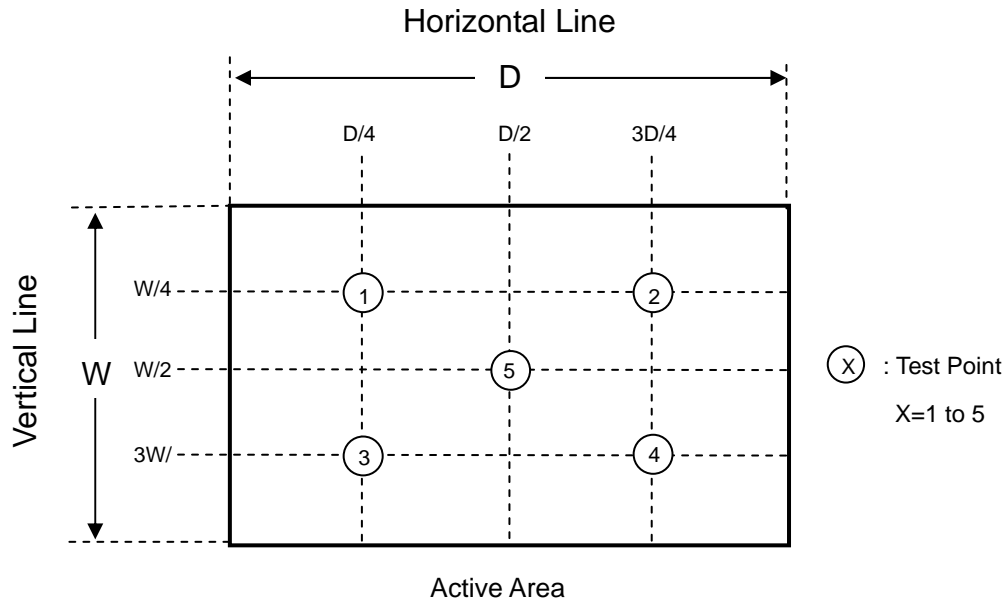
Note (7) Contrast Ratio in daylight:

Measuring carried out at backlight unit on

Sun lamp:10000 Lux

Contrast Ratio in daylight=Luminance of white screen/ Luminance of black screen

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8. RELIABILITY TEST CRITERIA

Test Item	Test Condition	Note
High Temperature Storage Test	85ºC, 240 hours	
Low Temperature Storage Test	-40ºC, 240 hours	
Thermal Shock Storage Test	-30ºC, 0.5hour　　80　, 0.5hour; 1hour/cycle,100cycles	
High Temperature Operation Test	80ºC, 240 hours	(1)(2)
Low Temperature Operation Test	-30ºC, 240 hours	
High Temperature & High Humidity Operation Test	60ºC, 90%RH, 240hours	
Shock (Non-Operating)	200G, 2ms, half sine wave, 1 time for ± X, ± Y, ± Z.	(3)
Vibration (Non-Operating)	1.5G, 10 ~ 300 Hz, 10min/cycle, 3 cycles each X, Y, Z	(3)

Note (1) There should be no condensation on the surface of panel during test.

Note (2) Temperature of panel display surface area should be 90 ºC Max.

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.

Note (4) In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before reliability test.
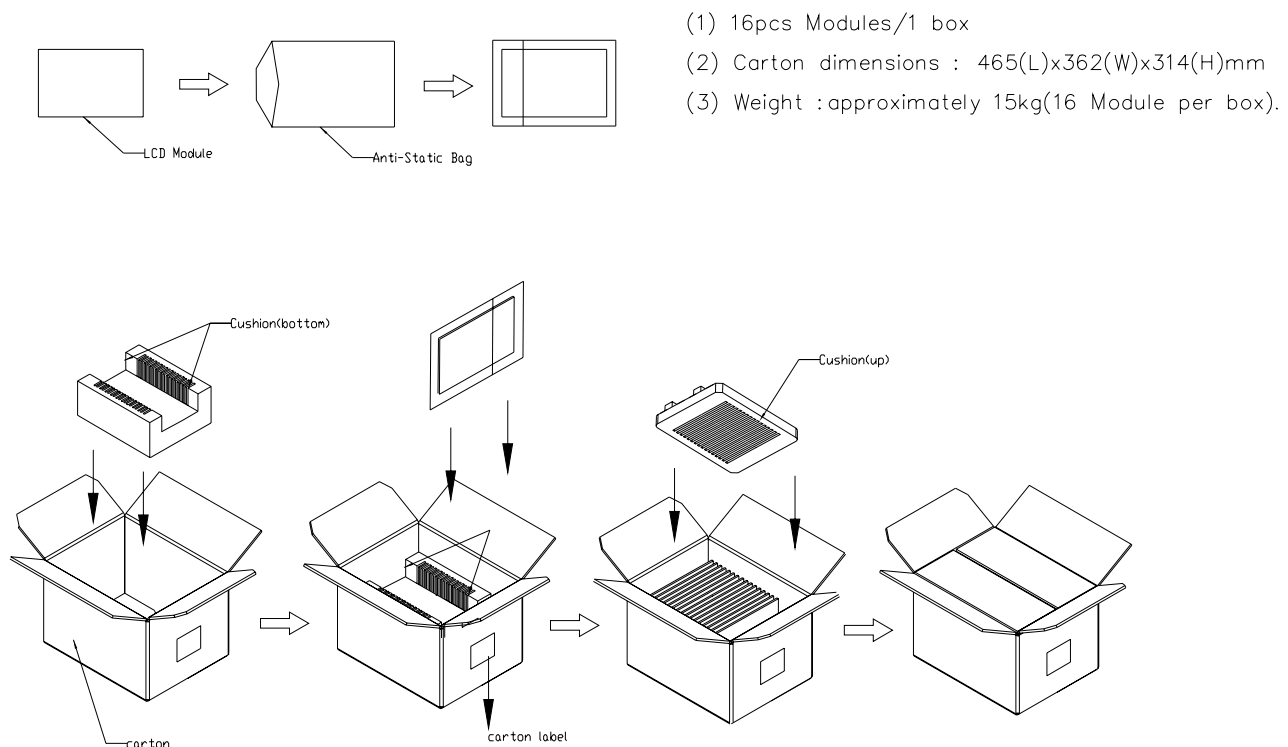
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9. PACKAGING

9.1 PACKING SPECIFICATIONS

(1) 16pcs LCD modules / 1 Box

(2) Box dimensions: 465 (L) X 362 (W) X 314 (H) mm

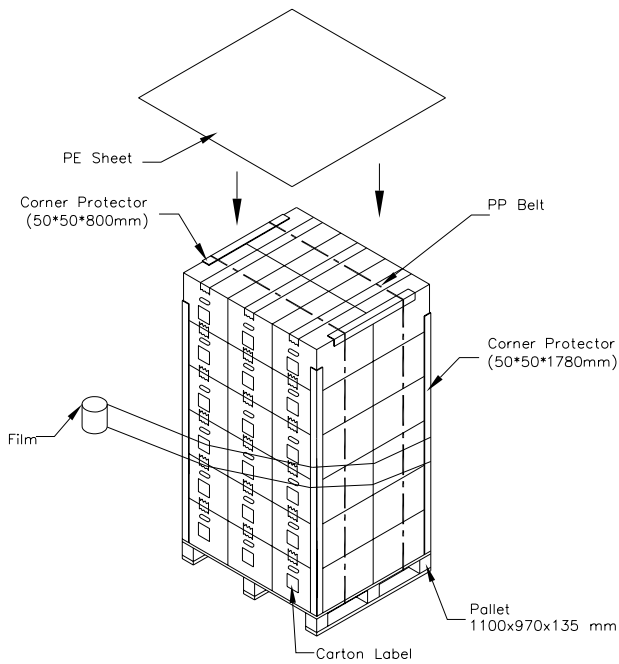(3) Weight: approximately 15Kg (16 modules per box)

9.2 PACKING METHOD

(1) Carton Packing should have no failure in the following reliability test items.

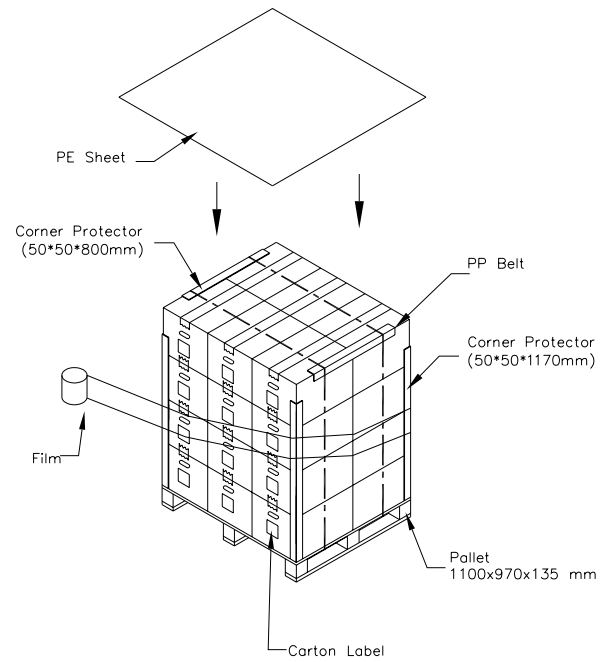| Test Item	Test Conditions	Note
Vibration	ISTA STANDARD Random, Frequency Range: 2 – 200 Hz Top & Bottom: 30 minutes (+Z), 10 min (-Z), Right & Left: 10 minutes (X) Back & Forth 10 minutes (Y)	Non Operation
Dropping Test	1 Angle, 3 Edge, 6 Face, 61 cm	Non Operation

(1) 16pcs Modules/1 box

(2) Carton dimensions : 465(L)x362(W)x314(H)mm

(3) Weight : approximately 15kg(16 Module per box).

Figure. 9-1 Packing method

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Sea / Land Transportation (40ft Container)   Air Transportation

PE Sheet

Corner Protector
(50*50*800mm)   PP Belt

Corner Protector
(50*50*1780mm)

Film

Pallet
1100x970x135 mm

Carton Label

PE Sheet

Corner Protector
(50*50*800mm)   PP Belt

Corner Protector
(50*50*1170mm)

Film

Pallet
1100x970x135 mm

Carton Label
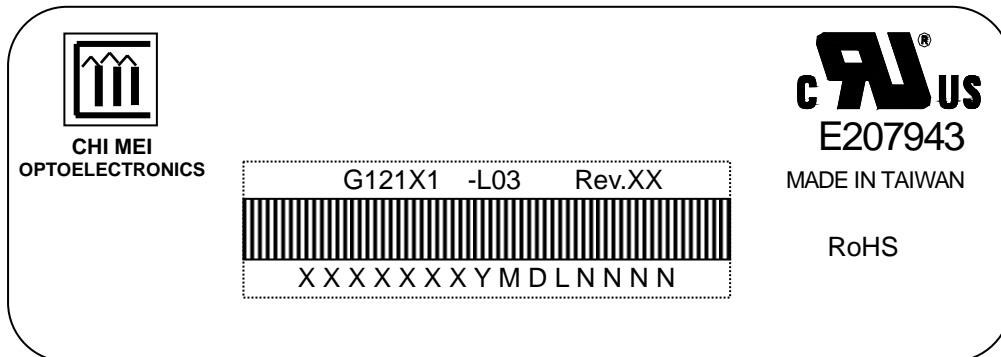
Figure. 9-2 Packing method
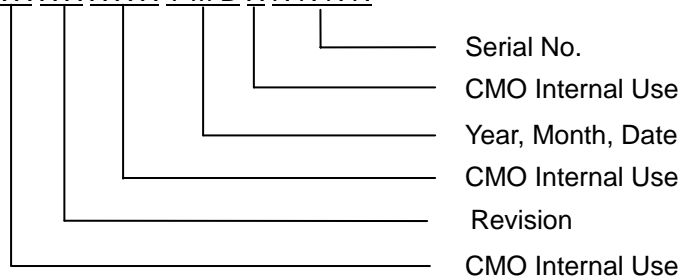
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10. DEFINITION OF LABELS

10.1 CMO MODULE LABEL

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

CHI MEI OPTOELECTRONICS

G121X1 -L03 Rev.XX

X X X X X X X Y M D L N N N N

E207943

MADE IN TAIWAN

RoHS

(a) Model Name: G121X1 -L03

(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

- Serial No.
- CMO Internal Use
- Year, Month, Date
- CMO Internal Use
- Revision
- CMO Internal Use

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

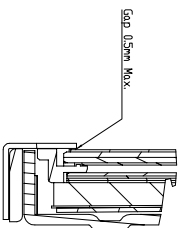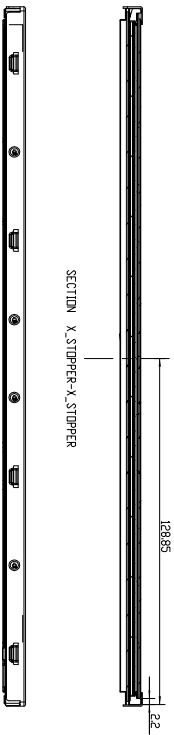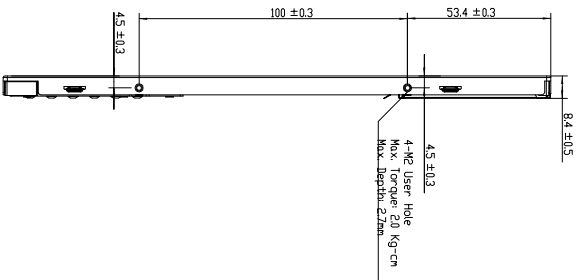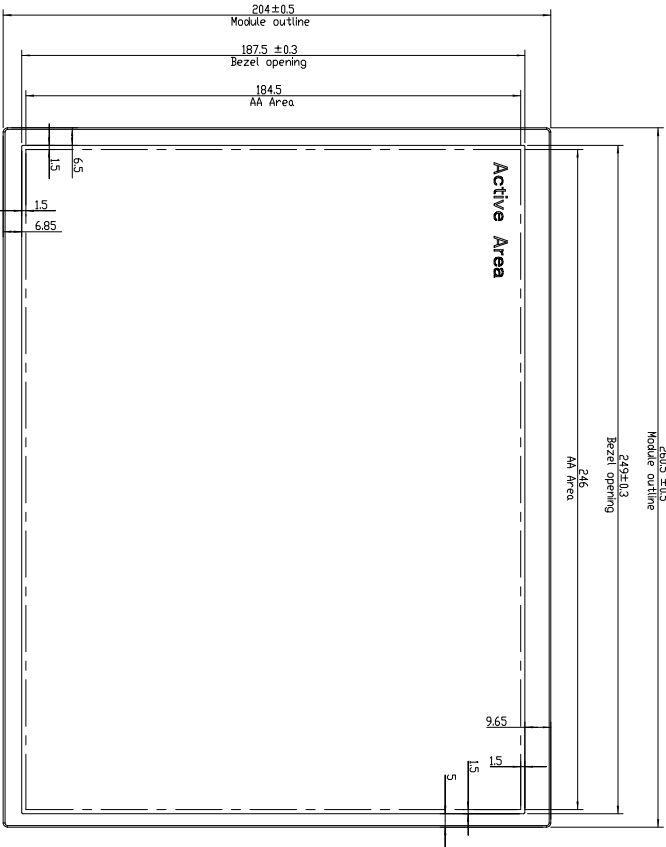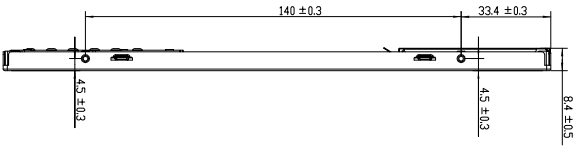**Version 2.0**

11. PRECAUTIONS

11.1 ASSEMBLY AND HANDLING PRECAUTIONS

(1) Do not apply rough force such as bending or twisting to the module during assembly.

(2) To assemble or install module into user's system can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.

(3) It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.

(4) Always follow the correct power sequence when LCD module is connecting and operating. This can prevent damage to the CMOS LSI chips during latch-up.

(5) Do not pull the I/F connector in or out while the module is operating.

(6) Do not disassemble the module.

(7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.

(8) It is dangerous that moisture come into or contacted the LCD module, because moisture may damage LCD module when it is operating.

(9) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.

(10) When ambient temperature is lower than 10ºC may reduce the display quality. For example, the response time will become slowly.

(11) Do not keep same pattern in a long period of time. It may cause image sticking on LCD.

11.2 SAFETY PRECAUTIONS

(1) Do not disassemble the module or insert anything into the Backlight unit.

(2) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.

(3) After the module's end of life, it is not harmful in case of normal operation and storage.

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Active Area

204 ±0.5
Module outline

187.5 ±0.3
Bezel opening

184.5
AA Area

260.5 ±0.5
Module outline

249±0.3
Bezel opening

246
AA Area

140 ±0.3

33.4 ±0.3

4.5 ±0.3

4.5 ±0.3

8.4 ±0.5

1.5
6.5

1.5
6.85

9.65

1.5
1.5

5

128.85

2.2

SECTION X_STOPPER-X_STOPPER

NOTES:
1.OUTLINE TOLERANCE ±0.5mm.
2.'✱' MARKS THE DESIGN CRITICAL DIMENSION.
3.'Ⓟ' MARKS THE PROCESS CRITICAL DIMENSION.
4.MAX SCREW LENGTH:2.7mm.
5.MAX SCREW TORQUE:2.0 Kg-cm.

Gap 0.5mm Max.

100 ±0.3

53.4 ±0.3

4.5 ±0.3

4.5 ±0.3

8.4 ±0.5

4-M2 User Hole
Max Torque: 2.0 Kg-cm
Max Depth: 2.7mm

SECTION Y-Y
SCALE 4:1

TITLE	ASS'Y MODULE_G120X1-L03
Approved	KL.Lin
Checked	Alan.lee
Drawer	YuTing.Tsai
Designer	YuTing.Tsai
Material	
Part No.	TBD
Date	08-May-2009
Scale	1:1
Drawing No.	G120X4001
Sheet	1 / 2
Unit:	mm

2D REV:
3D REV:1.13+

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NOTES:
1.OUTLINE TOLERANCE: ±0.5mm.
2.'★' MARKS THE DESIGN CRITICAL DIMENSION.
3.'(P)' MARKS THE PROCESS CRITICAL DIMENSION.
4.MAX SCREW LENGTH≧2.7mm.
5.MAX SCREW TORQUE≦2.0 kg-cm.

66.95

91208-01001-H01 (ACES)
89.5
FI-SEB20P-HF(LA3) or Equivalent
195.45
54.66
Pin 1
AL Tape
Pin 1
Pin 1
55.36

Mark	Description	Date	Changed_By Approved_By ECN No. Remark

TITLE	ASSY_MODULE_G121XN-L03
Approved	KL_Lin
Checked	Alan_Lee
Drawer	YuTing_Tsai
Designer	YuTing_Tsai

Drawing No.
Part No.
Material: TBD
Date 08-May-2009
Scale 1:1
Sheet 2 / 2
Unit:mm
A1

2D REV: 0
3D REV: 1.13*

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G121X4011