奇美電子
CHIMEI INNOLUX

APPROVAL SPECIFICATION

☐ Tentative Specification
☐ Preliminary Specification
■ Approval Specification

MODEL NO.: V260B3
SUFFIX: P05

Customer:

APPROVED BY **SIGNATURE**

Name / Title _____ _____

Note

Please return 1 copy for your confirmation with your signature and comments.

Approved By	Checked By	Prepared By
Chao-Chun Chung	Vincent Chou	Delia Lin

奇美電子 CHIMEI INNOLUX

APPROVAL SPECIFICATION

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REVISION HISTORY

Version	Date	Page (New)	Section	Description
Ver 2.0	Aug.12,'10	All	All	Approval Specification was first issued.

1. GENERAL DESCRIPTION

1.1 OVERVIEW

V260B3- P05 is a 26-inch TFT LCD cell with driver ICs and 1ch-LVDS interface. This module supports 1366 x 768 WXGA format and can display 16.7M colors (8-bit/color). The backlight unit is not built in

1.2 CHARACTERISTICS

CHARACTERISTICS ITEMS	SPECIFICATIONS
Screen Diagonal [in]	26.0
Pixels [lines]	1366×768
Active Area [mm]	575.769×323.712
Sub -Pixel Pitch [mm]	0.1405(H)×0.4215(V)
Pixel Arrangement	RGB vertical stripe
Weight [g]	TYP. 820
Physical Size [mm]	Refer to 2D Drawing
Display Mode	MVA, Normally Black
Contrast Ratio	(3000:1) Typ. (Typical value measured at CMO's module)
Glass thickness (Array/CF) [mm]	0.7 / 0.7
Viewing Angle (CR>20)	+88/-88(H), +88/-88(V) Typ. (Typical value measured at CMO's module)
Color Chromaticity	R=0.655, 0.328 G=0.269,0.598 B=0.131,0.12 W=0.299,0.355 *Please refer to "color chromaticity" on p.19
Cell Transparency [%]	5.0%Typ. (Typical value measured at CMO's module)
Polarizer (CF side)	Anti-Glare coating 587.4(H) x 335.2(w). Hardness: 3H
Polarizer (TFT side)	587.4(H) x 335.2(w).

1.3 MECHANICAL SPECIFICATIONS

Item	Min.	Typ.	Max.	Unit	Note
Weight		820		g	
I/F connector mounting position	The mounting inclination of the connector makes the screen center within ±0.5mm as the horizontal.				(1)

Note (1) Connector mounting position

+/- 0.5mm

2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT (BASED ON CMO MODULE V260B3-L05)

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

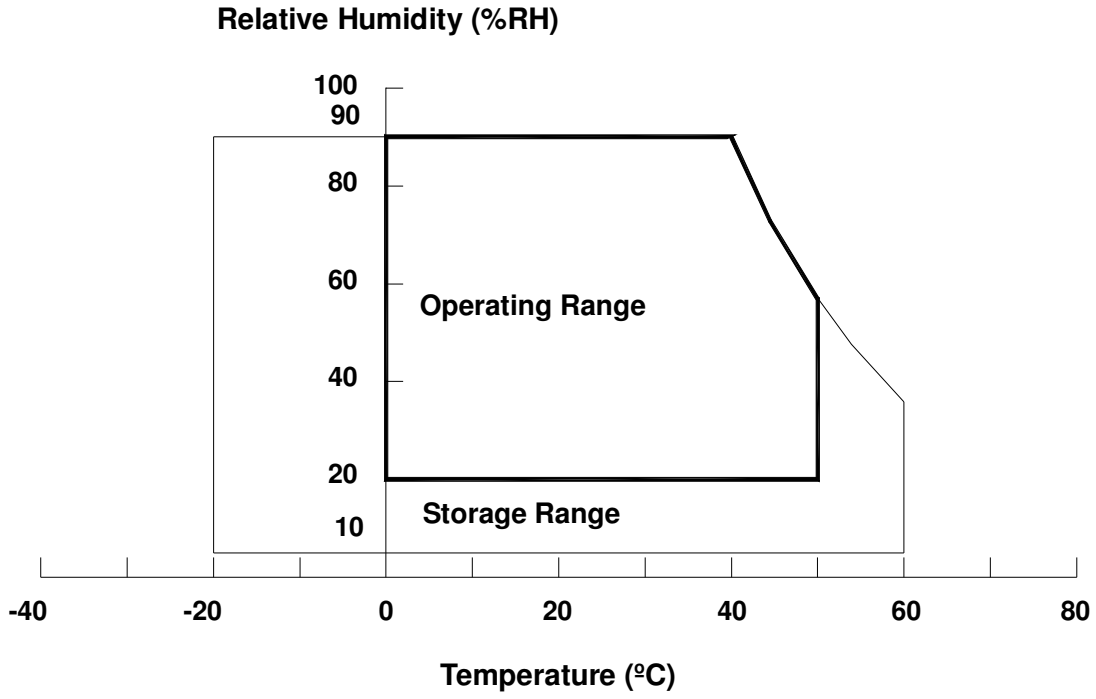
Note (1) Temperature and relative humidity range is shown in the figure below.

(a) 90 %RH Max. (Ta ≦ 40 ºC).

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

(c) No condensation.

Note (2) The maximum operating temperature is based on the test condition that the surface temperature of display area is less than or equal to 65 ºC with LCD module alone in a temperature controlled chamber. Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 65 ºC. The range of operating temperature may degrade in case of improper thermal management in final product design.



2.2 ABSOLUTE RATINGS OF ENVIRONMENT (OPEN CELL)

Storage Condition : With shipping package.

Storage temperature range : 25±5 ℃

Storage humidity range : 50±10%RH

Shelf life : a month

2.3 ELECTRICAL ABSOLUTE RATINGS

2.3.1 ELECTRICAL ABSOLUTE RATINGS (OPEN CELL)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	Vcc	-0.3	13.5	V	(1)
Input Signal Voltage	V_{IN}	-0.3	3.6	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.

3. ELECTRICAL CHARACTERISTICS

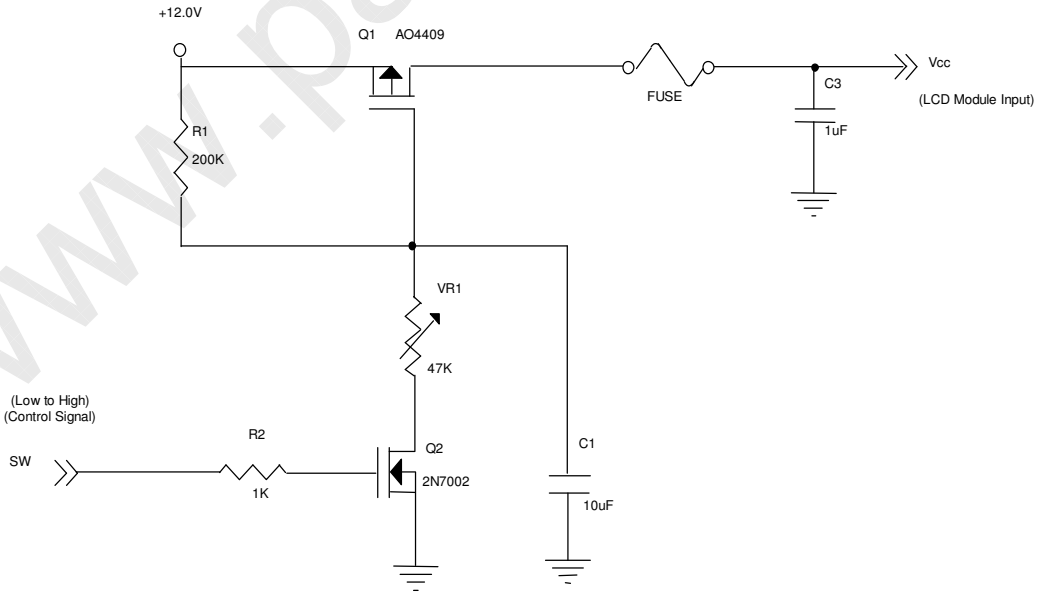
3.1 TFT LCD MODULE

Ta = 25 ± 2 ºC

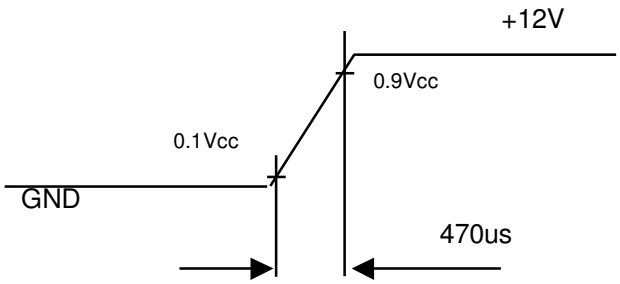
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V_{CC}	10.8	12	13.2	V	(1)
Rush Current		I_{RUSH}	–	–	3.5	A	(2)
Power Supply Current	White Pattern	–	–	0.45	0.50	A	(3)
	Horizontal Stripe	–	–	0.45	0.50	A	
	Black Pattern	–	–	0.35	0.40	A	
LVDS interface	Differential Input High Threshold Voltage	V_{LVTH}	+100	–	–	mV	(4)
	Differential Input Low Threshold Voltage	V_{LVTL}	–	–	-100	mV	
	Common Input Voltage	V_{CM}	1.0	1.2	1.4	V	
	Differential input voltage (Single-end)	$\|V_{ID}\|$	200	–	600	mV	
	Terminating Resistor	R_T	–	100	–	ohm	
CMOS interface	Input High Threshold Voltage	V_{IH}	2.7	–	3.3	V	
	Input Low Threshold Voltage	V_{IL}	0	–	0.7	V	

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

Note (2) Measurement Conditions:



Vcc rising time is 470us



Note (3) The specified power supply current is under the conditions at Vcc = 12 V, Ta = 25 ± 2 ºC, f_v = 60 Hz, whereas a power dissipation check pattern below is displayed.

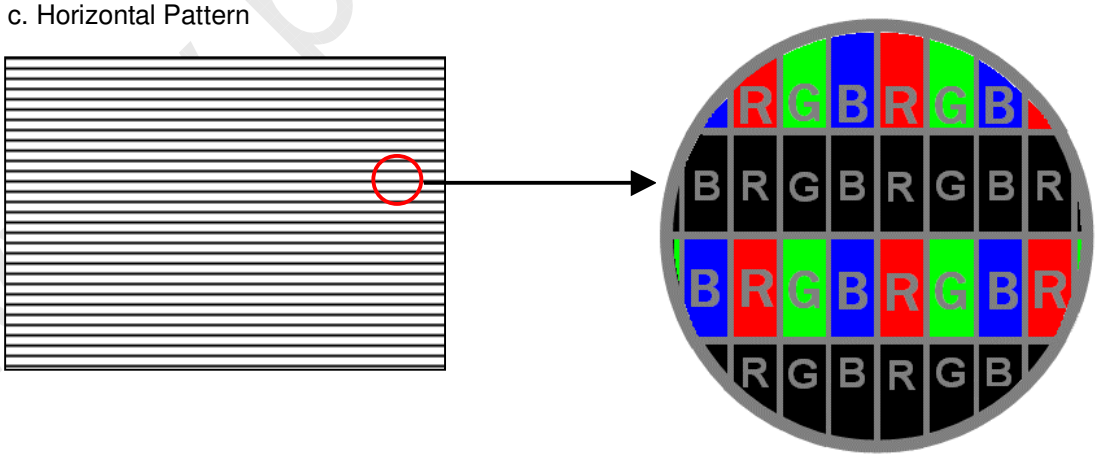
a. White Pattern

Active Area

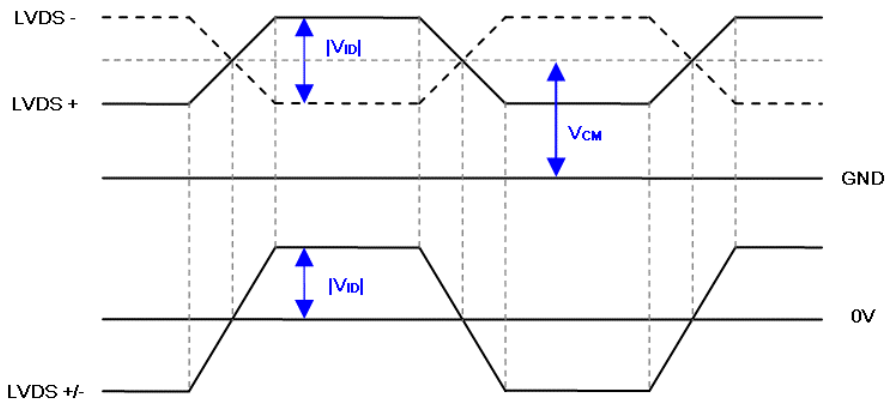
b. Black Pattern

Active Area

c. Horizontal Pattern

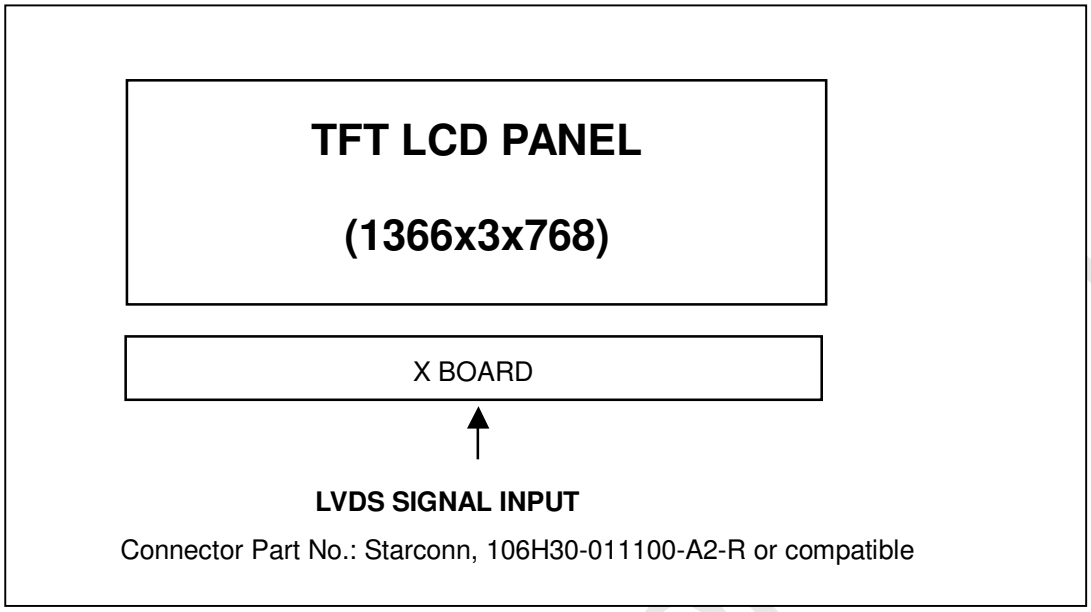


Note (4) The LVDS input characteristics are as follows:



4. BLOCK DIAGRAM

4.1 TFT LCD MODULE



5. INTERFACE PIN CONNECTION

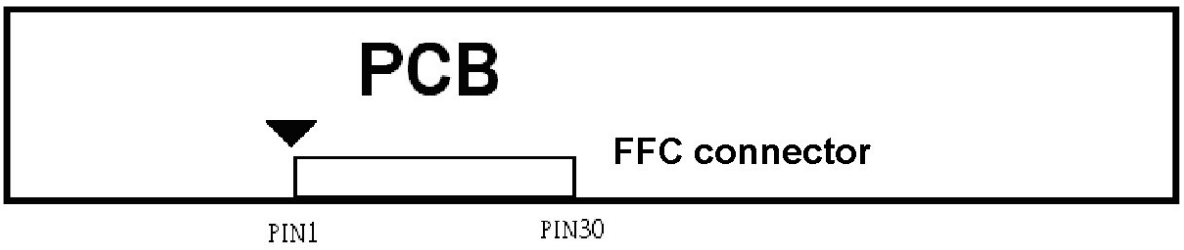
5.1 TFT LCD MODULE

CN1 Connector Pin Assignment

Pin No.	Symbol	Description	Note
1	NC	No connection	(3)
2	SCL	EEPROM Serial Clock	
3	SDA	EEPROM Serial Data	
4	GND	Ground	
5	RX0-	Negative transmission data of pixel 0	
6	RX0+	Positive transmission data of pixel 0	
7	GND	Ground	
8	RX1-	Negative transmission data of pixel 1	
9	RX1+	Positive transmission data of pixel 1	
10	GND	Ground	
11	RX2-	Negative transmission data of pixel 2	
12	RX2+	Positive transmission data of pixel 2	
13	GND	Ground	
14	RXCLK-	Negative of clock	
15	RXCLK+	Positive of clock	
16	GND	Ground	
17	RX3-	Negative transmission data of pixel 3	
18	RX3+	Positive transmission data of pixel 3	
19	GND	Ground	
20	PANEL_SEL	No connection	
21	SELLVDS	Select LVDS data format	(2),(4)
22	WP	EEPROM Write Protection	
23	GND	Ground	
24	GND	Ground	
25	NC	No connection	(3)
26	VCC	Power supply: +12V	
27	VCC	Power supply: +12V	
28	VCC	Power supply: +12V	
29	VCC	Power supply: +12V	
30	VCC	Power supply: +12V	

Note (1) Connector Part No.: Starconn, 106H30-011100-A2-R or compatible

LVDS connector pin order defined as follows



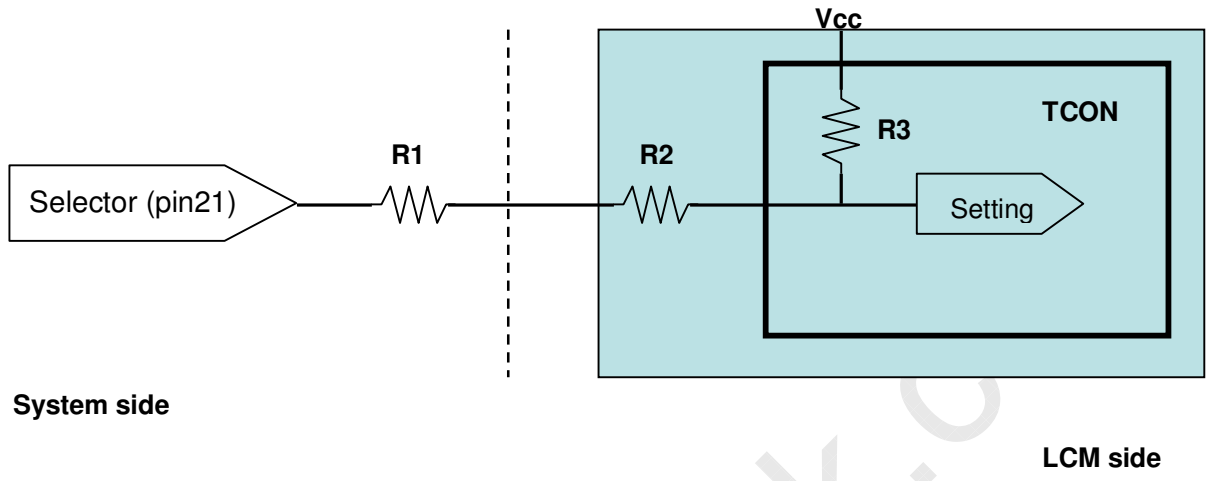
Note (2) High = Open or connect to +3.3V: VESA Format, Low = Connect to GND: JEIDA Format.

Please refer to 5.3 LVDS INTERFACE

Note (3) Reserved for internal use. Please leave it open.

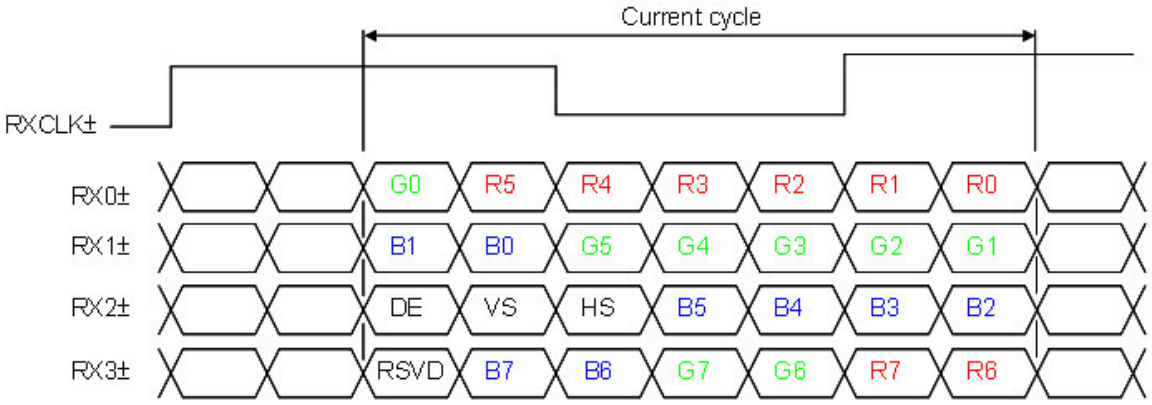
Note (4) LVDS signal pin connected to the LCM side has the following diagram.

R1 in the system side should be less than 1K Ohm. (R1 < 1K Ohm)

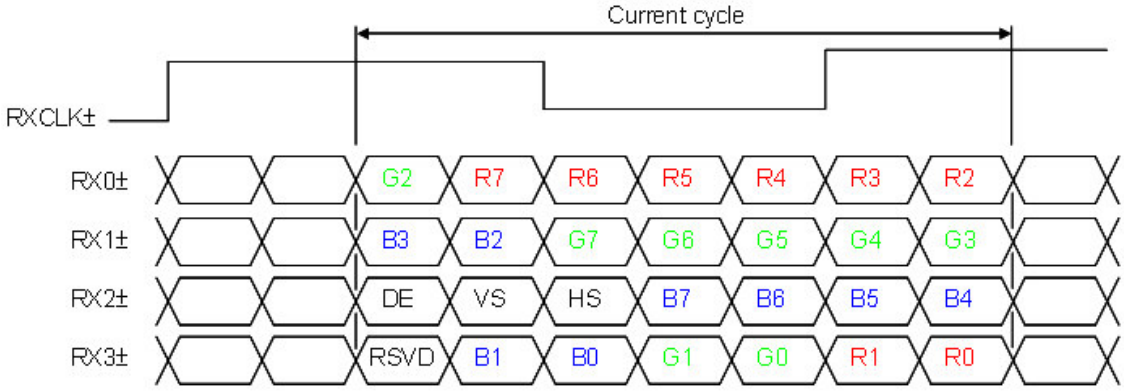


5.2 LVDS INTERFACE

VESA LVDS format：(SELLVDS pin=H or open)



JEDIA LVDS format：(SELLVDS pin=L)



R0~R7: Pixel R Data (7; MSB, 0; LSB)

G0~G7: Pixel G Data (7; MSB, 0; LSB)

B0~B7: Pixel B Data (7; MSB, 0; LSB)

DE: Data enable signal

Notes(1) RSVD(reserved)pins on the transmitter shall be “H” or(“L” or OPEN)

5.3 COLOR DATA INPUT ASSIGNMENT

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

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
LVDS Receiver Clock	Frequency	F_{clkin} (=1/TC)	60	76	82	MHz	
	Input cycle to cycle jitter	T_{rcl}	—	—	200	ps	(3)
	Spread spectrum modulation range	F_{clkin_mod}	F_{clkin}-2%	—	F_{clkin}+2%	MHz	(4)
	Spread spectrum modulation frequency	F_{SSM}			200	KHz	
LVDS Receiver Data	Setup Time	Tlvsu	600	—	—	ps	(5)
	Hold Time	Tlvhd	600	—	—	ps	
Vertical Active Display Term	Frame Rate	F_{r5}	47	50	53	Hz	(6)
		F_{r6}	57	60	63	Hz	
	Total	Tv	778	806	1000	Th	Tv=Tvd+Tvb
	Display	Tvd	768	768	768	Th	—
	Blank	Tvb	10	38	232	Th	—
Horizontal Active Display Term	Total	Th	1442	1560	1936	Tc	Th=Thd+Thb
	Display	Thd	1366	1366	1366	Tc	—
	Blank	Thb	76	194	570	Tc	—

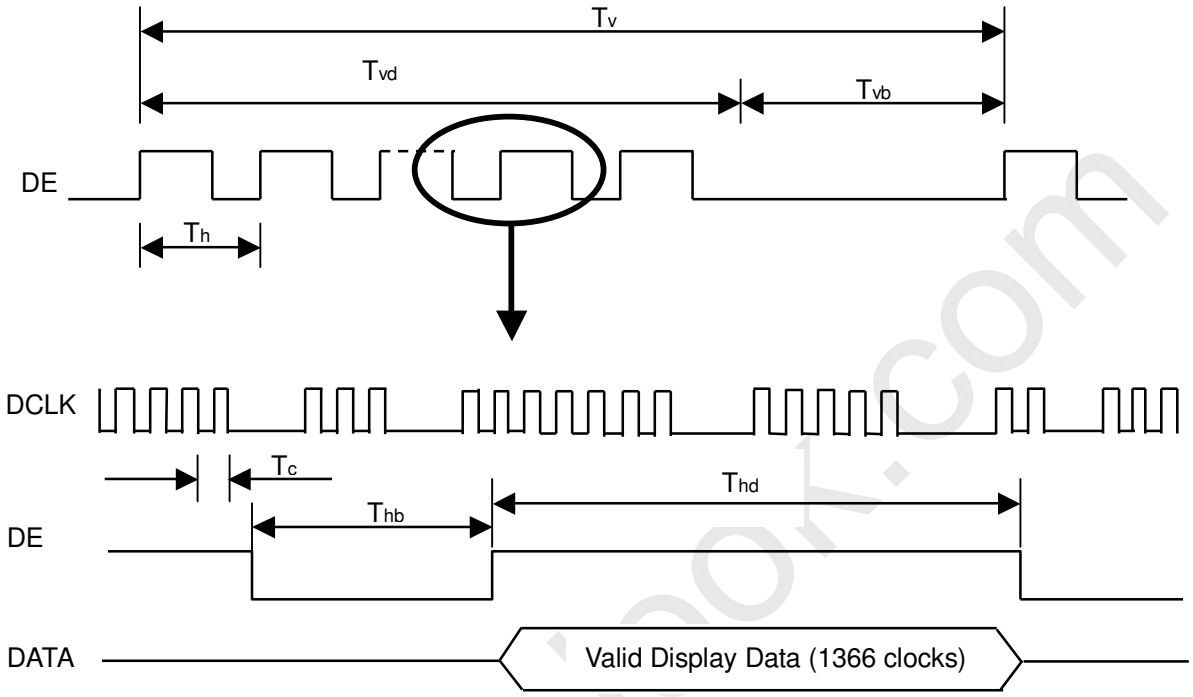
Note (1) Please make sure the range of pixel clock has follow the below equation：

$F_{clkin(max)} \geqq F_{r6} \times Tv \times Th$

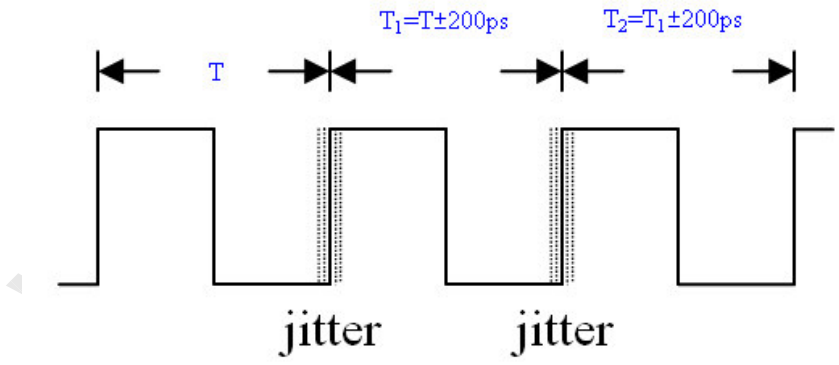
$F_{r5} \times Tv \times Th \geqq F_{clkin(min)}$

Note (2) This module is operated in DE only mode and please follow the input signal timing diagram below：

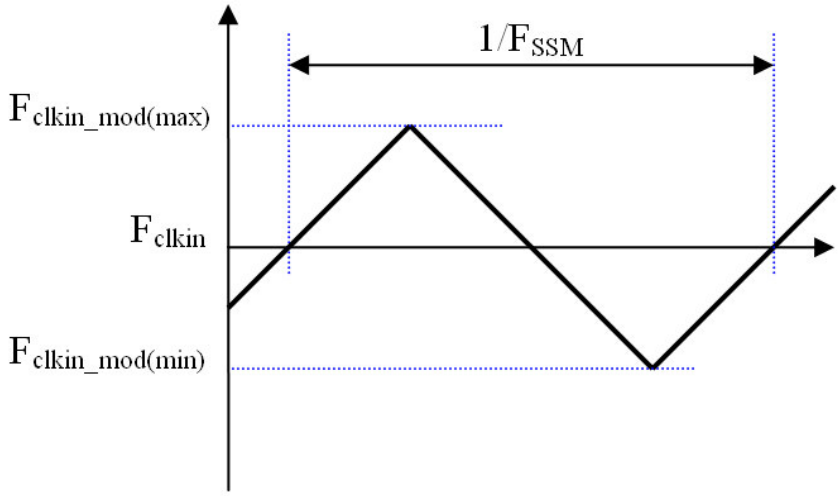
INPUT SIGNAL TIMING DIAGRAM



Note (3) The input clock cycle-to-cycle jitter is defined as below figures. Trcl = l T_1 – Tl

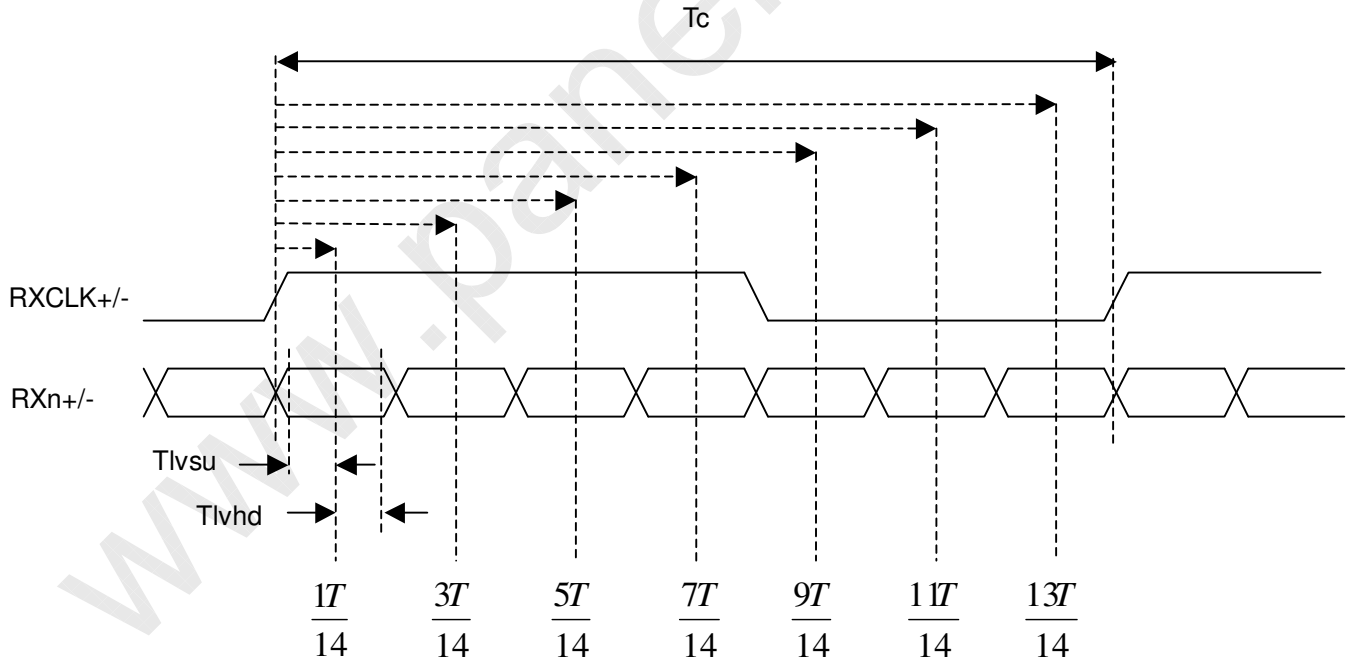


Note (4) The SSCG (Spread spectrum clock generator) is defined as below figures.



Note (5) The LVDS timing diagram and setup/hold time is defined and showing as the following figures.

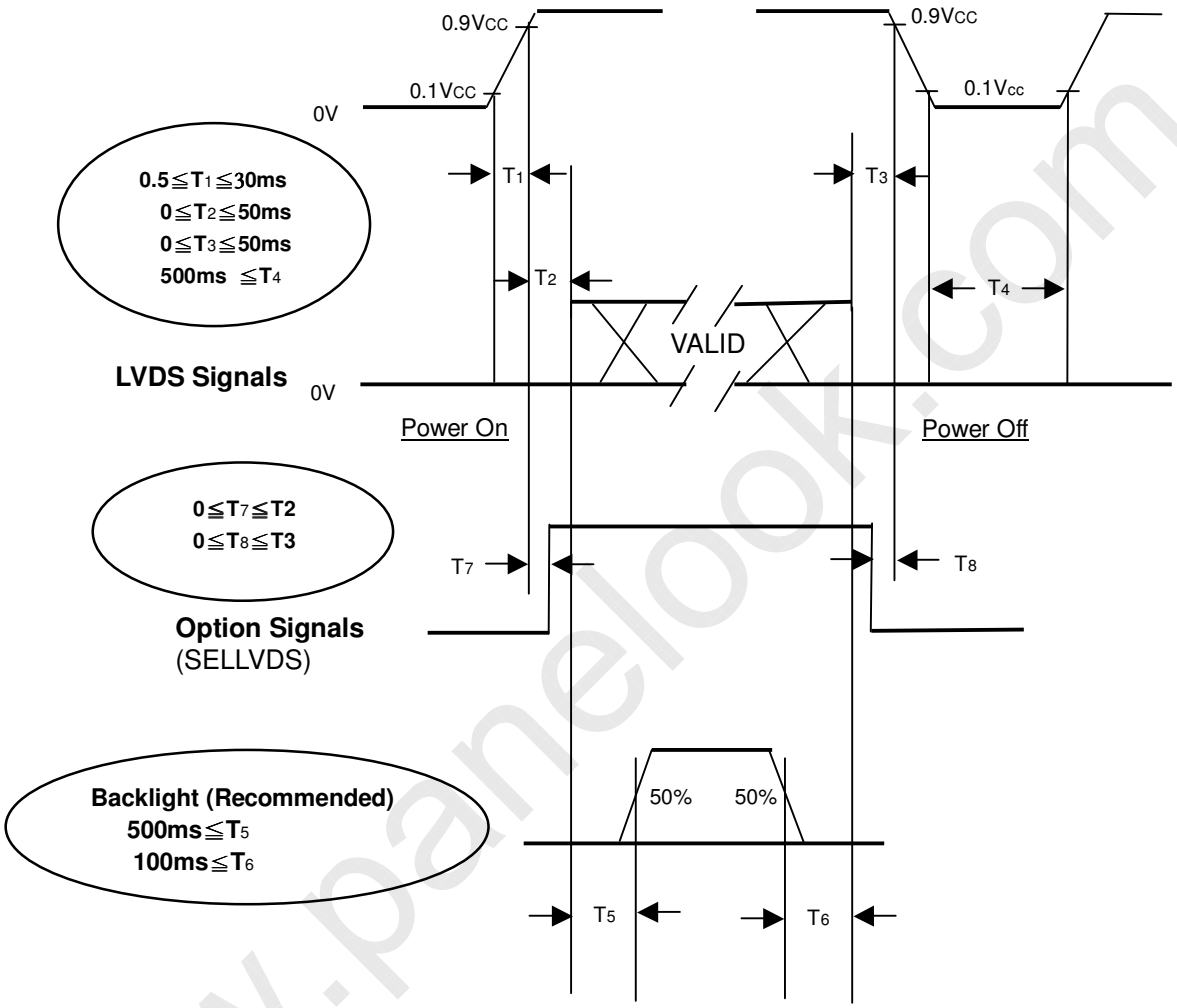
LVDS RECEIVER INTERFACE TIMING DIAGRAM



6.2 POWER ON/OFF SEQUENCE

(Ta = 25 ± 2 ºC)

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



Power ON/OFF Sequence

7. OPTICAL CHARACTERISTICS

7.1 TEST CONDITIONS

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	V_{CC}	12.0	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
Lamp Current	I_L	10.0 ± 0.5	mA
Oscillating Frequency (Inverter)	F_W	58 ± 3	KHz
Vertical Frame Rate	Fr	60	Hz

7.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown as below. 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	Rcx	θ_x=0°, θ_Y =0° Viewing Angle at Normal Direction Standard light source "C"	-	0.655	-	-	(0),(5)
		Rcy			0.328		-	
	Green	Gcx			0.268		-	
		Gcy			0.598		-	
	Blue	Bcx			0.131		-	
		Bcy			0.12		-	
	White	Wcx			0.299		-	
		Wcy			0.355		-	
Center Transmittance		T%	θ_x=0°, θ_Y =0° with CMO module	-	5.0	-	%	(1),(7)
Contrast Ratio		CR			3000	-		(1),(3)
Response Time		Gray to gray	θ_x=0°, θ_Y =0° with CMO Module@60Hz	-	8.5		ms	(4)
				-				
White Variation		δW	θ_x=0°, θ_Y =0° with CMO module	-	-	1.3	-	(1),(6)
Viewing Angle	Horizontal	θ_x+	CR≥20 With CMO module		88		Deg.	(1),(2)
		θ_x-			88			
	Vertical	θ_Y+			88			
		θ_Y-			88			

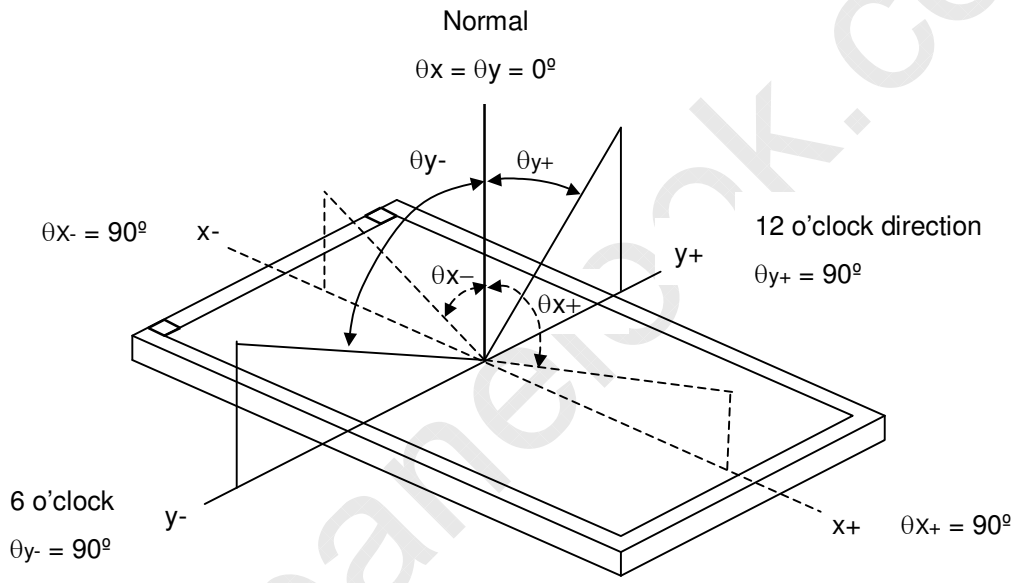
Note (0) Light source is the standard light source "C" which is defined by CIE and driving voltage are based on suitable gamma voltages. The calculating method is as following :

1. Measure Module's and BLU's spectrum. White is without signal input and R,G,B are with signal input. BLU (for V260B3-L05) is supplied by CMO.
2. Calculate cell's spectrum.
3. Calculate cell's chromaticity by using the spectrum of standard light source "C".

Note (1) Light source is the BLU which is supplied by CMO and driving voltage are based on suitable gamma voltages.

Note (2) Definition of Viewing Angle (θx, θy):

Viewing angles are measured by Conoscope Cono-80



Note (3) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

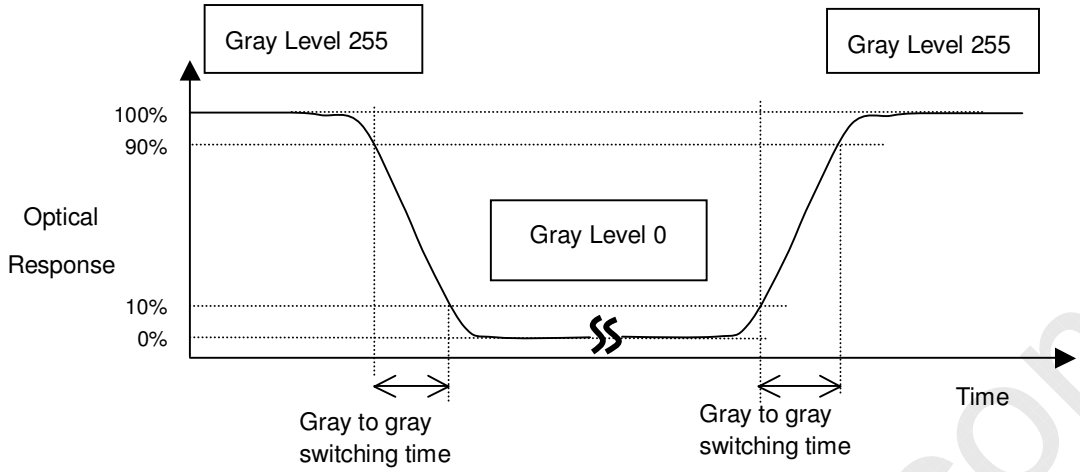
Contrast Ratio (CR) = L255 / L0

L255: Luminance of gray level 255

L 0: Luminance of gray level 0

CR = CR (5), where CR (X) is corresponding to the Contrast Ratio of the point X at the figure in Note (6).

Note (3) Definition of Gray to Gray Switching Time :

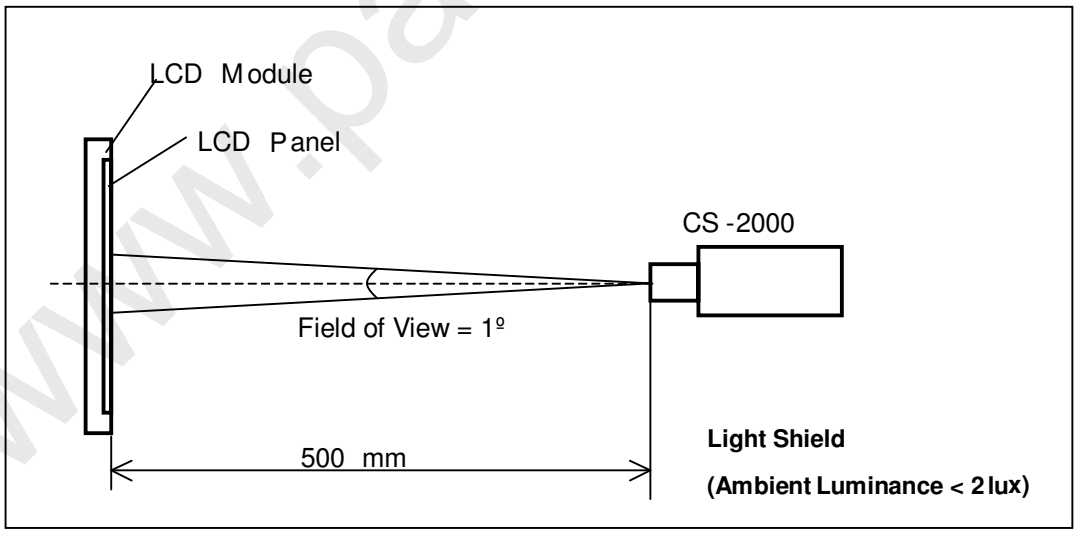


The driving signal means the signal of luminance 0%, 20%, 40%, 60%, 80%, 100%.

Gray to gray average time means the average switching time of luminance 0%, 20%, 40%, 60%, 80%, 100% to each other.

Note (5) Measurement Setup:

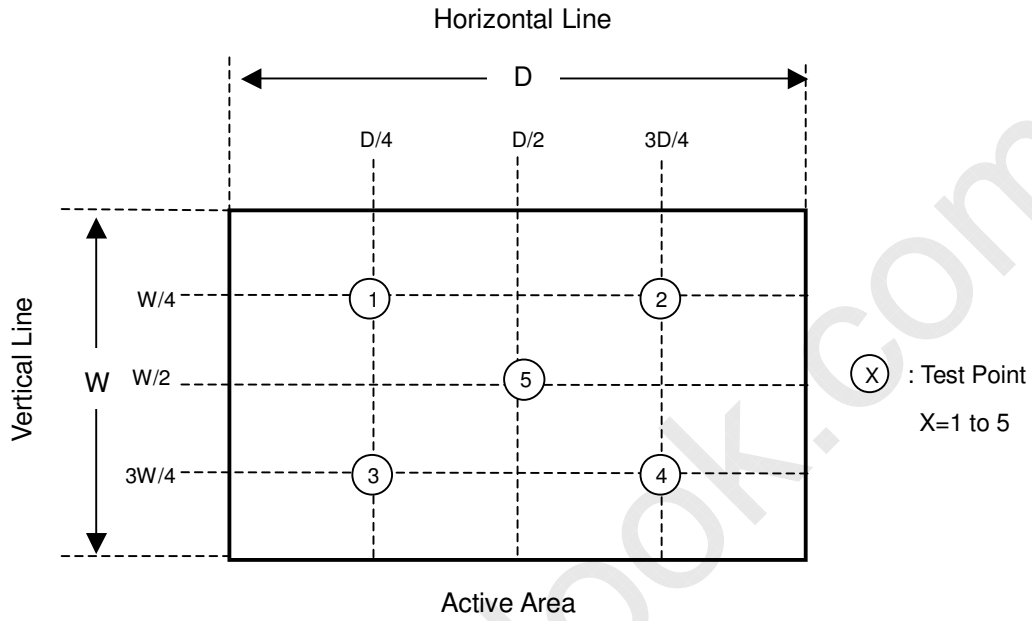
The LCD module should be stabilized at given temperature for 1 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room.



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

Measure the luminance of gray level 255 at 5 points

δW = Maximum [L (1), L (2), L (3), L (4), L (5)] / Minimum [L (1), L (2), L (3), L (4), L (5)]



Note (7) Definition of Transmittance (T%) :

Module is without signal input.

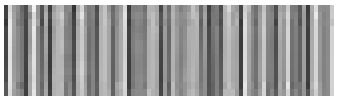
$$\text{Transmittance} = \frac{\text{Luminance of LCD module}}{\text{Luminance of backlight}} * 100\%$$

8. DEFINITION OF LABELS

8.1 OPEN CELL LABEL

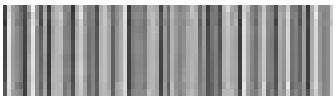
The barcode nameplate is pasted on each open cell as illustration for CMO internal control.

V260B3-P05



XXXXXXXXXXXXX

V260B3-P05 Rev.



XXXXXXXXXXXXX

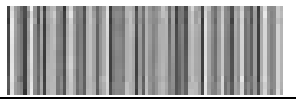
8.2 CARTON LABEL

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

P.O. NO._____

Parts ID._____

Carton ID._____ Quantities 21



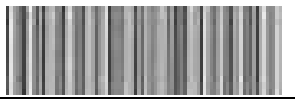
XXXXXXXXXXXXX

Made in Taiwan

P.O. NO._____

Parts ID._____

Carton ID._____ Quantities 21



XXXXXXXXXXXXX

Made in China

(a) Model Name: V260B3– P05

(b) Carton ID: CMO internal control

(c) Quantities: 21

9. PACKAGING

9.1 PACKING SPECIFICATIONS

(1) 21PCS LCD TV Panels / 1 Box

(2) Box dimensions : 812 (L) X 572 (W) X 277 (H)

(3) Weight : approximately 27.5 Kg

9.2 PACKING METHOD

Figures 9-1 and 9-2 are the packing method

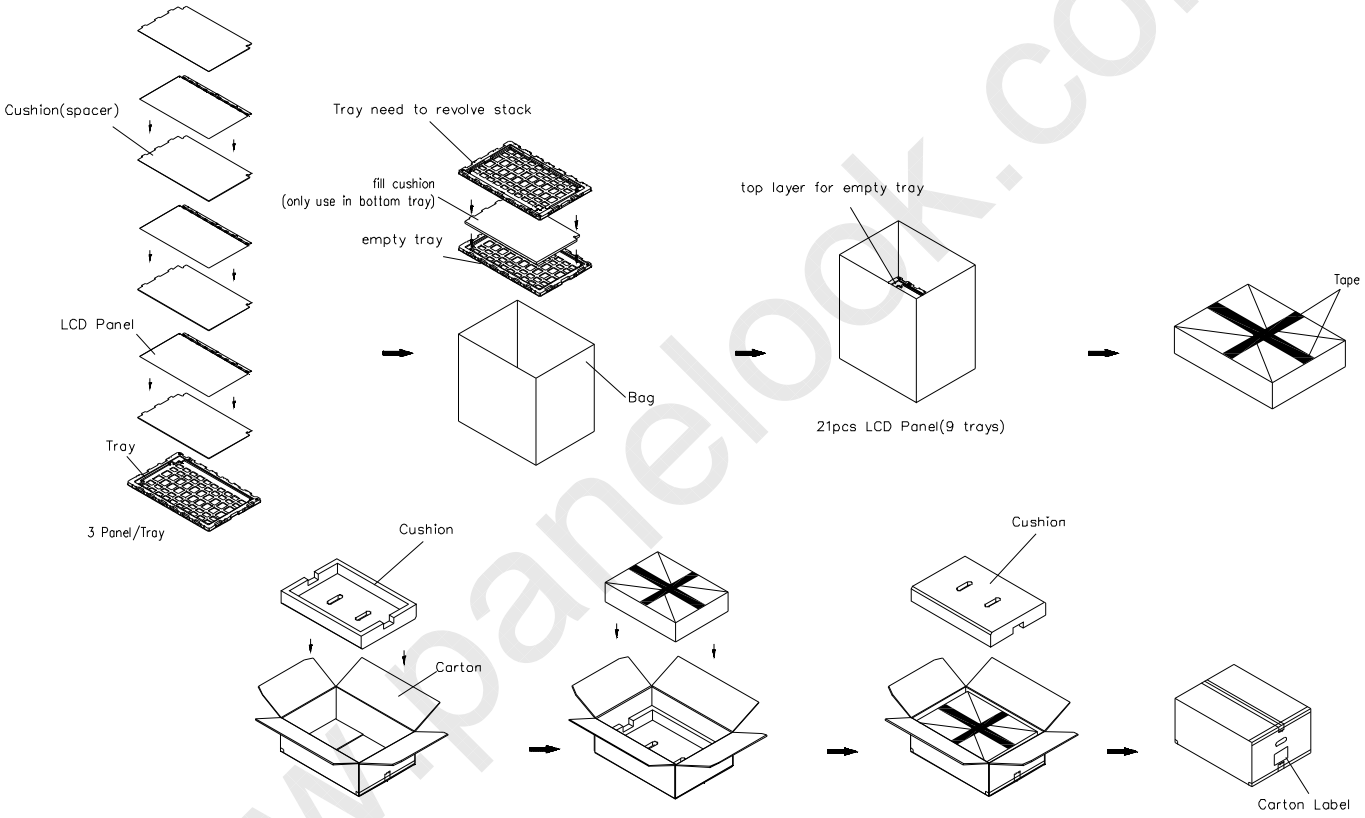
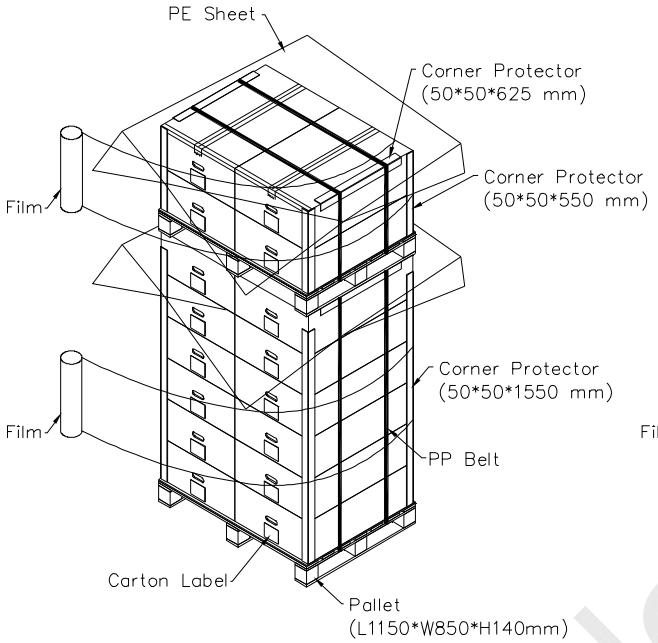
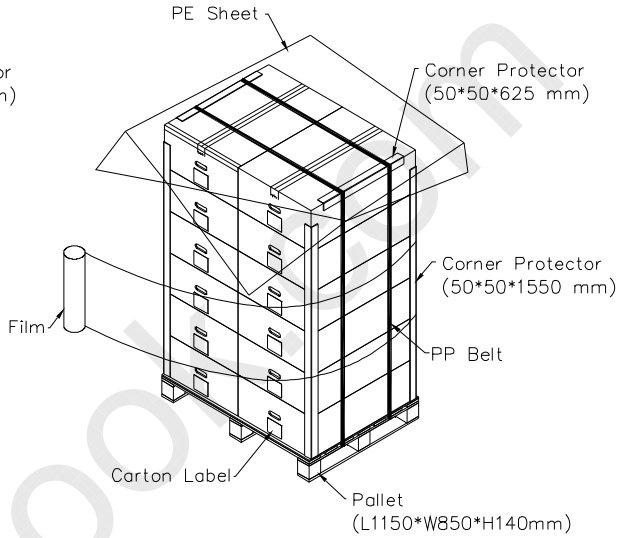


Figure.9-1 packing method

Sea / Land Transportation
(40ft HQ Container)



Sea / Land Transportation
(40ft Container)



Air Transportation

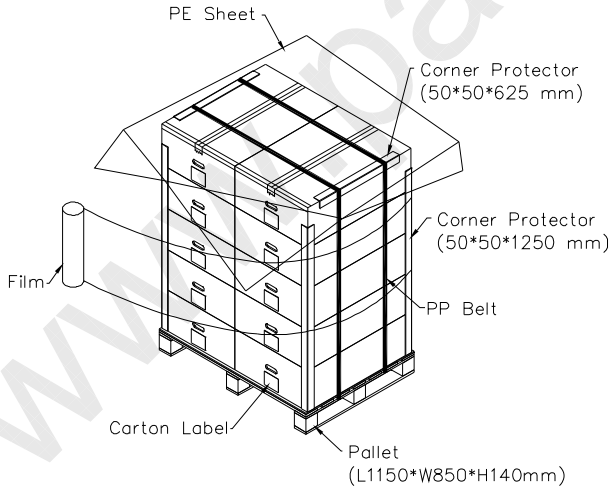


Figure.9-2 packing method

10. PRECAUTIONS

10.1 ASSEMBLY AND HANDLING PRECAUTIONS

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

(2) To assemble backlight 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 will be damaged.

(4) Always follow the correct power sequence when the product 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) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.

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

(8) High temperature or humidity may reduce the performance of module. Please store this product within the specified storage conditions.

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

10.2 SAFETY PRECAUTIONS

(1) 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.

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

11. MECHANICAL CHARACTERISTICS