CHI MEI OPTOELECTRONICS CORP.

Approval

TFT LCD Approval Specification

MODEL NO.: V260B3 – P01

Customer: _____

Approved by: _____

Note:

Approved By	TV Head Division	
	C C Chung	

Reviewed By	QA Dept.	Product Development Div.
	Hsin-Nan Chen	WT Lin

Prepared By	LCD TV Marketing and Product Management Div.	
	Josh Chi	Jim Ho

1

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

Approval

- CONTENTS -

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

Approval

REVISION HISTORY

Version	Date	Page (New)	Section	Description
Ver 2.0	Dec.03,'09	All	All	Approval Specification was first issued.

Version 2.0

Approval

1. GENERAL DESCRIPTION

1.1 OVERVIEW

V260B3- P01 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 (6-bit+Hi-FRC). 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=0.646, 0.330 G=0.275,0.593 B=0.144,0.063 W=0.279,0.287 *Please refer to "color chromaticity" on p.16
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

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

Approval
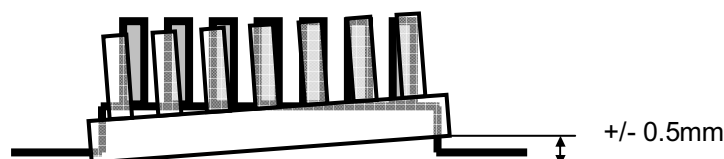
2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT (BASED ON CMO MODULE V260B3-L03)

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)
Shock (Non-Operating)	S_{NOP}	—	50	G	(3), (5)
Vibration (Non-Operating)	V_{NOP}	—	1.0	G	(4), (5)

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

  (a) 90 %RH Max. (Ta $\leqq$ 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.

Note (3) 11 ms, half sine wave, 1 time for ± X, ± Y, ± Z.

Note (4) 10 ~ 500 Hz, 10 min, 1 time each X, Y, Z.

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.

Relative Humidity (%RH)

Temperature (ºC)

5

Version 2.0
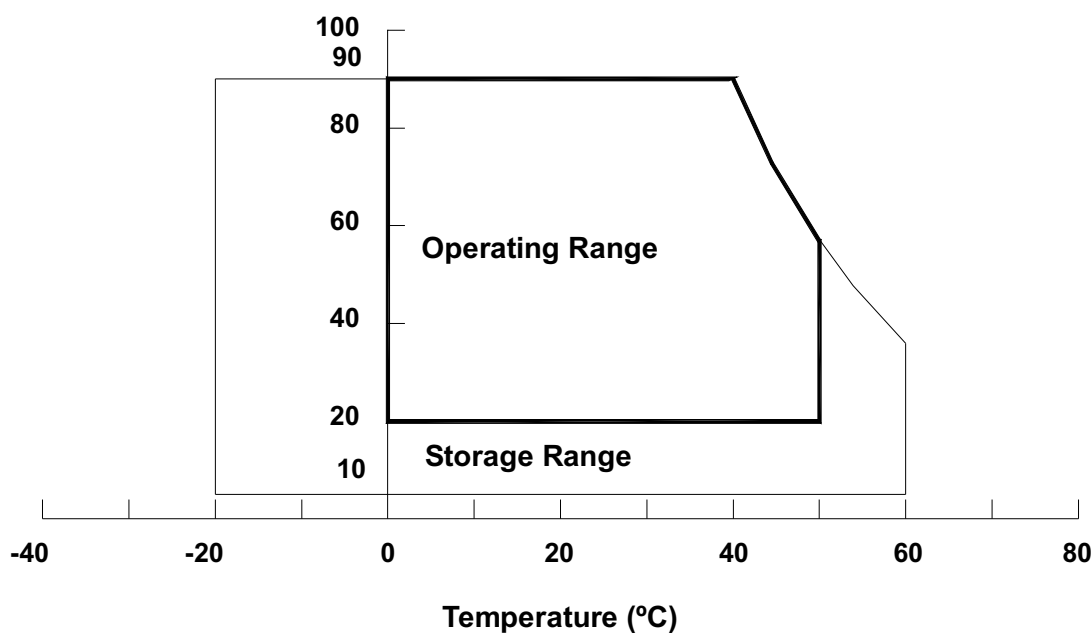
2.2 ABSOLUTE RATINGS OF ENVIRONMENT (OPEN CELL)

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.

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

Approval

3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD MODULE

Ta = 25 ± 2 ℃

Parameter			Symbol	Value			Unit	Note
				Min.	Typ.	Max.		
Power Supply Voltage			V_{CC}	10.8	12.0	13.2	V	(1)
Rush Current			I_{RUSH}	—	—	3.0	A	(2)
Power Supply Current	White		I_{CC}	—	0.40	0.50	A	(3)
	Black			—	0.30	0.35	A	
	Vertical Stripe			—	0.4	0.50	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_{LVC}	1.0	1.2	1.4	V	
	Differential input voltage		$|V_{ID}|$	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:
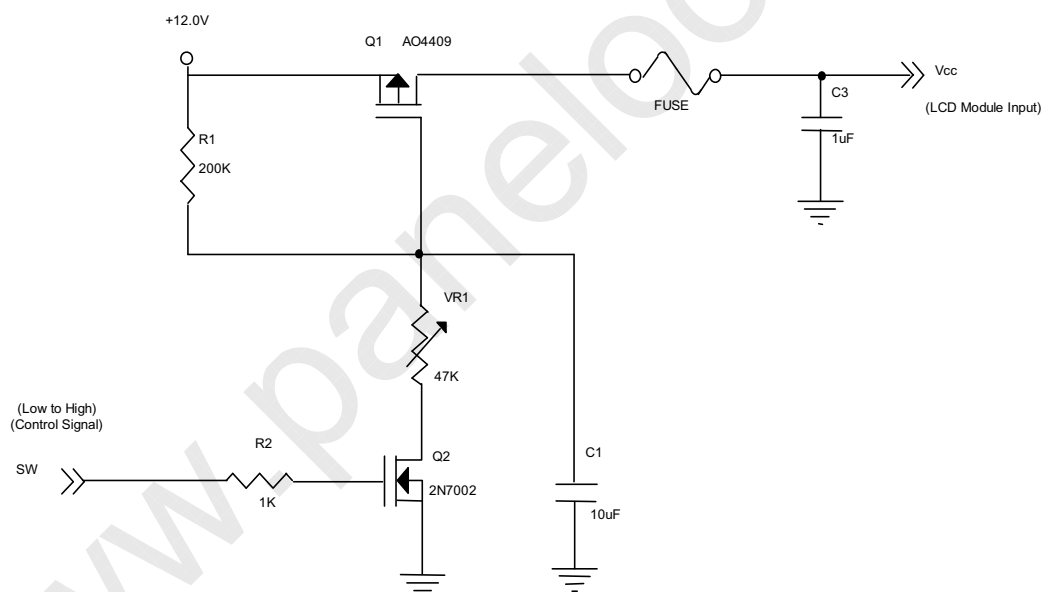
Vcc rising time is 470us

7

Version 2.0

Approval
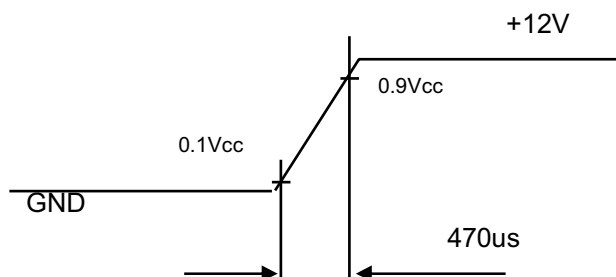
Note (3) The specified power supply current is under the conditions at Vcc = 12 V, Ta = 25 ± 2 ºC, f_v = 60

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

a. White Pattern
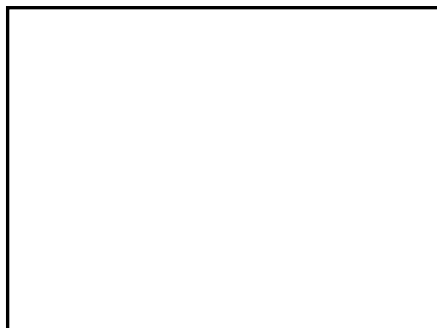
b. Black Pattern

Active Area

Active Area

c. Vertical Stripe Pattern

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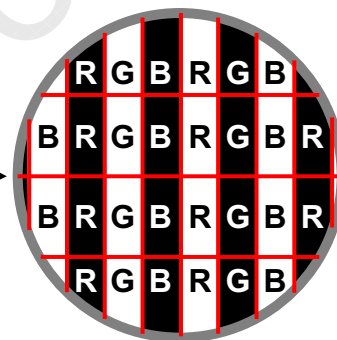
Note (4) The LVDS input characteristics are as follows:

8

Version 2.0

Approval
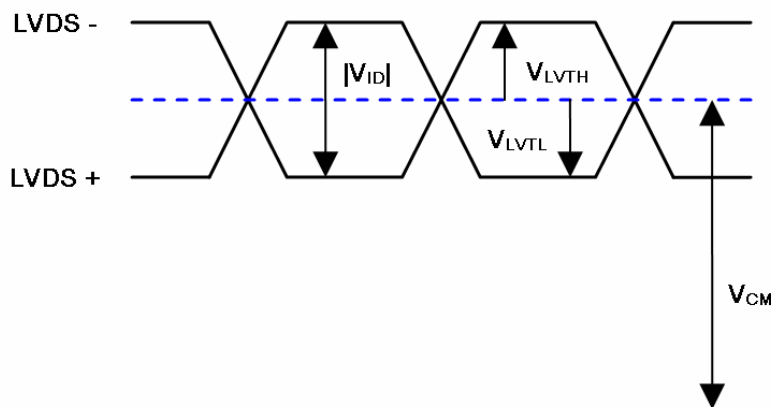
4. BLOCK DIAGRAM

4.1 TFT LCD MODULE

TFT LCD PANEL

(1366x3x768)

X BOARD

↑

LVDS SIGNAL INPUT

Connector Part No.: FCI, 10041195-001 or compatible

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01
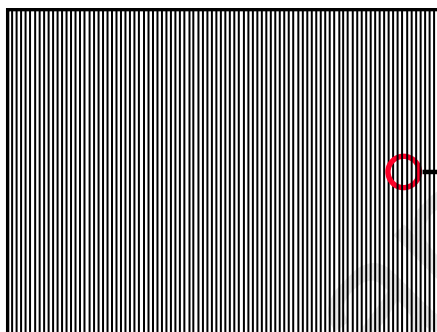
Approval
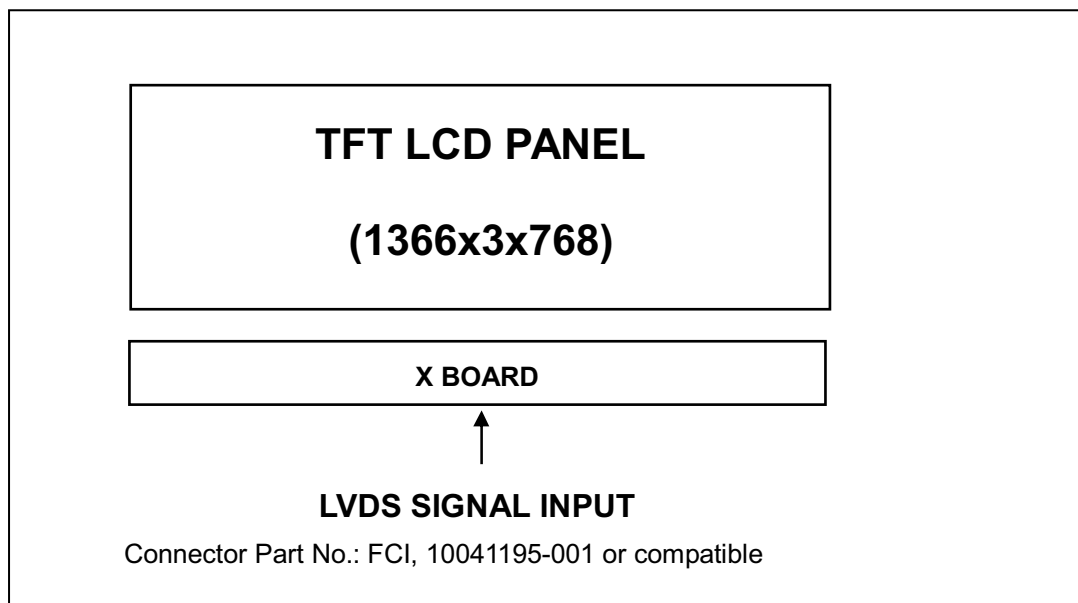
5. INPUT TERMINAL PIN ASSIGNMENT

5.1 TFT LCD MODULE

CN1 Connector Pin Assignment

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

Note (1) Connector Part No.: FCI, 10041195-001 or compatible

LVDS connector pin order defined as follows
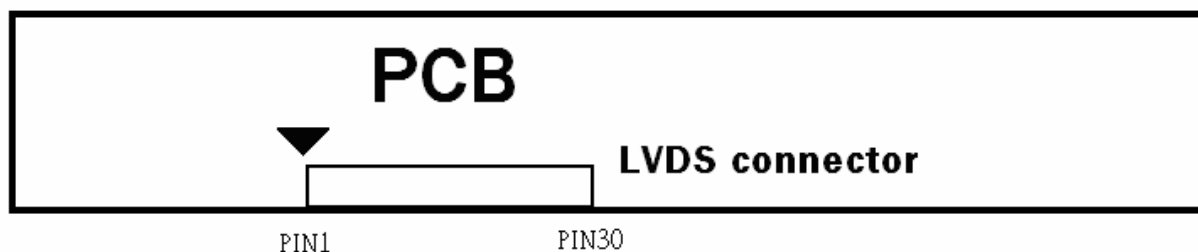
Note (2) Low = Open or connect to GND: VESA Format, High = Connect to +3.3V: JEIDA Format.

Please refer to 5.5 LVDS INTERFACE

Note (3) Overdrive lookup table selection. The Overdrive lookup table should be selected in accordance to the

frame rate to optimize image quality.

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

Approval

Low = Open or connect to GND, High = Connect to +3.3V

ODSEL	Note
L or Open	Lookup table was optimized for 60 Hz frame rate.
H	Lookup table was optimized for 50 Hz frame rate.

Note (4) Reserved for internal use. Left it open.

Note (5) 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)

11

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

Approval
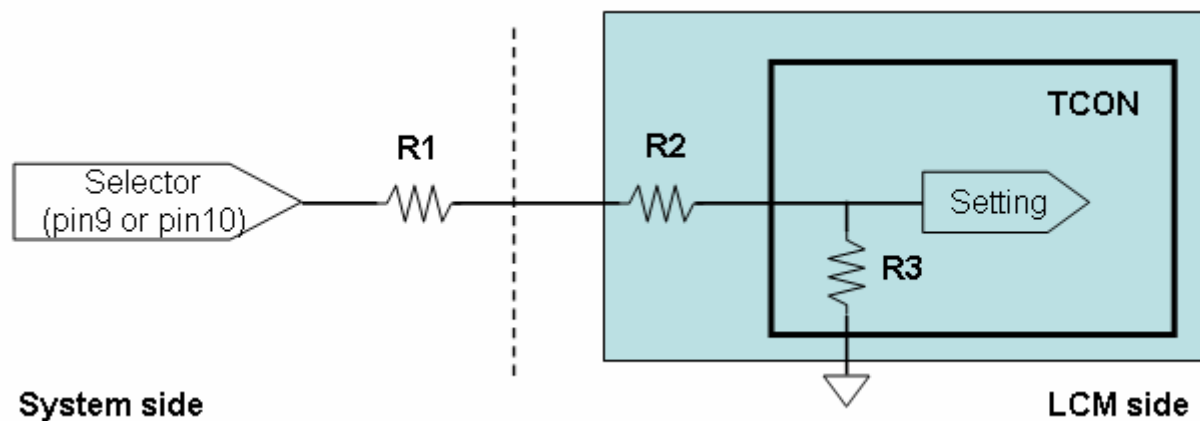
5.2 LVDS INTERFACE

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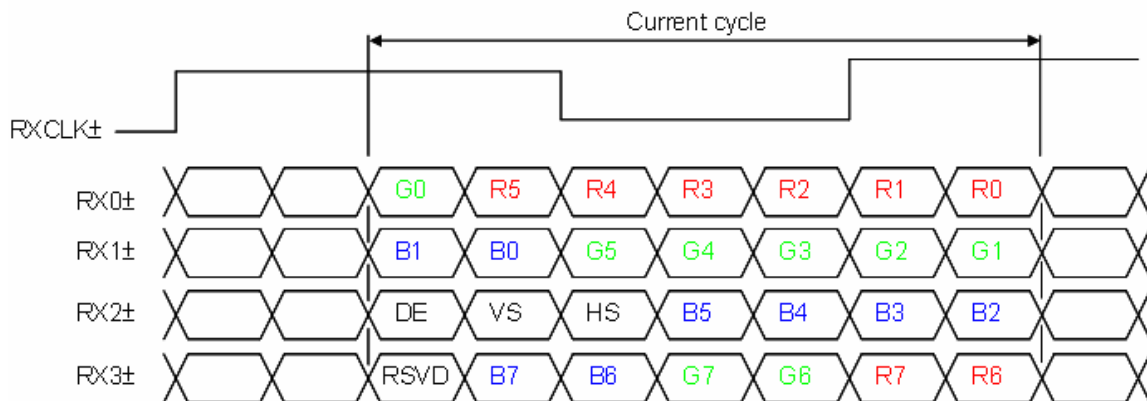
JEDIA LVDS format：(SELLVDS pin=H)

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)

12

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

Approval

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.

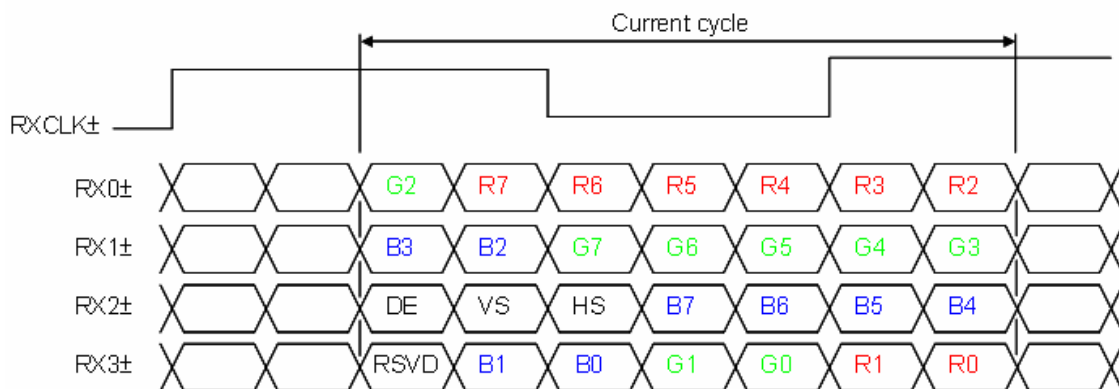| Color		Data Signal																							
		Red								Green								Blue							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	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

13

Version 2.0

Approval

6. INTERFACE TIMING

6.1 INPUT SIGNAL TIMING SPECIFICATIONS

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	888	Th	Tv=Tvd+Tvb
	Display	Tvd	768	768	768	Th	—
	Blank	Tvb	10	38	120	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：

$$Fclkin(max) \geq Fr6 \times Tv \times Th$$

$$Fr5 \times Tv \times Th \geq Fclkin(min)$$

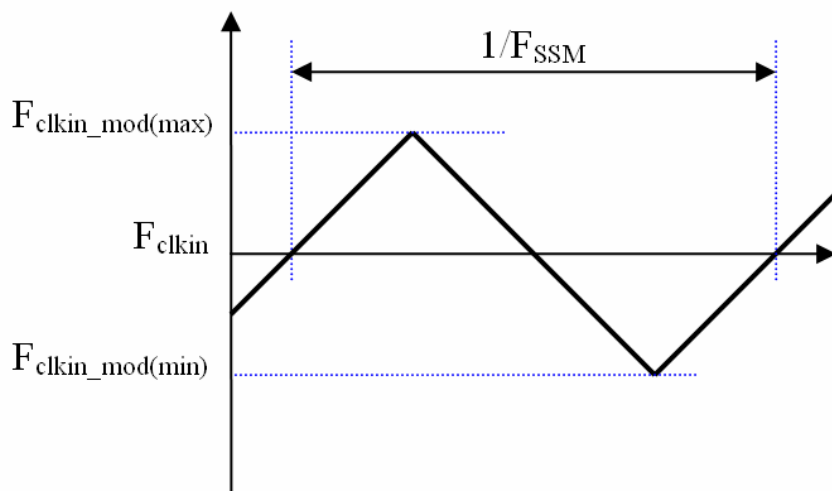Note (2)　This module is operated in DE only mode and please follow the input signal timing diagram below：

14

Approval

INPUT SIGNAL TIMING DIAGRAM
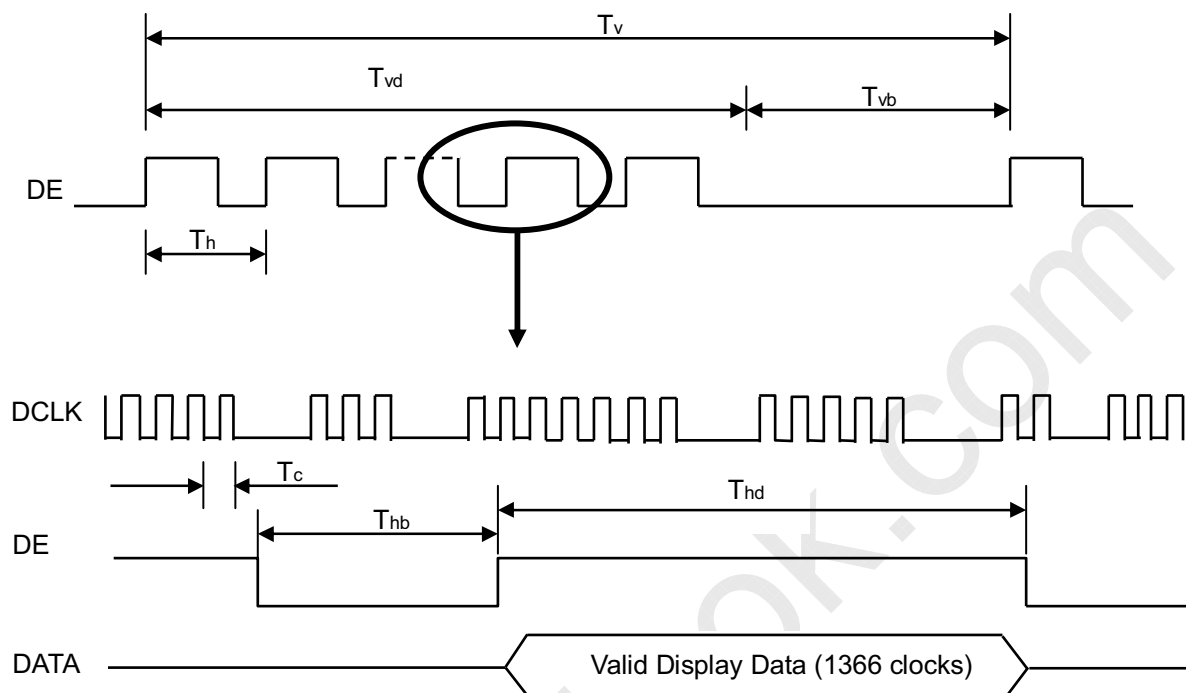
Note (3) The input clock cycle-to-cycle jitter is defined as below figures. Trcl = I T_1 – TI
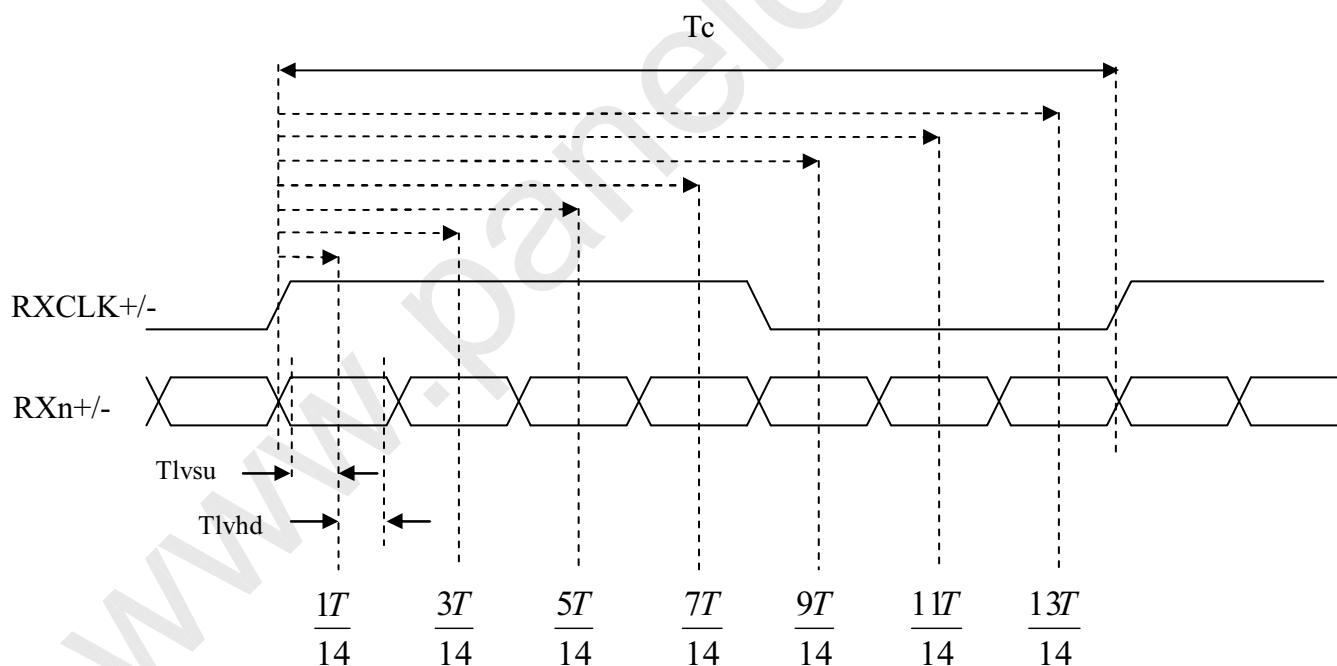

15

Version 2.0

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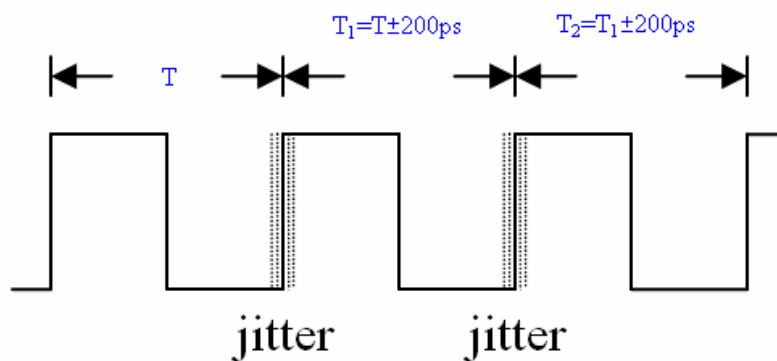
Note (4) The SSCG (Spread spectrum clock generator) is defined as below figures.

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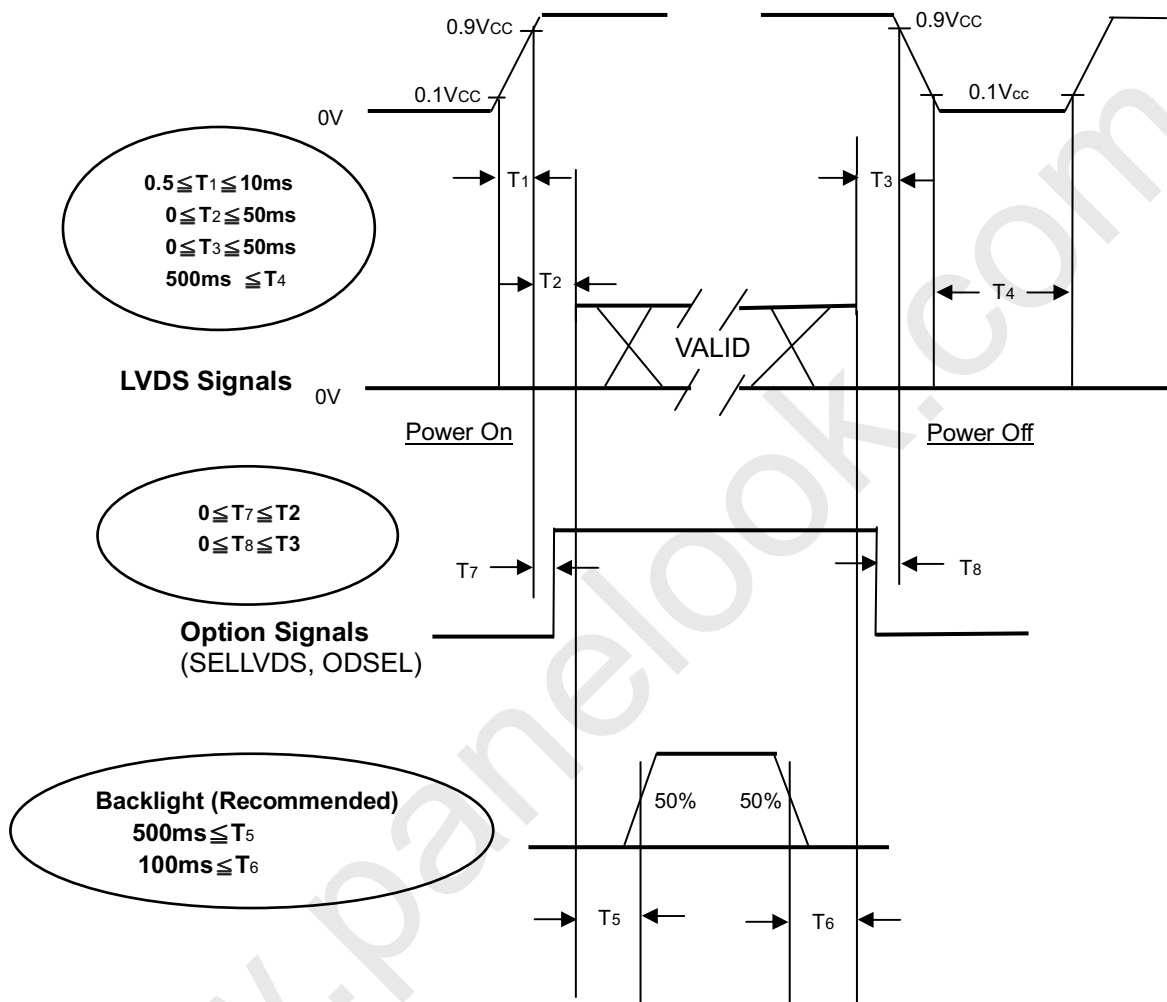
LVDS RECEIVER INTERFACE TIMING DIAGRAM

Note (6) : (ODSEL) = H/L or open for 50/60Hz frame rate. Please refer to 5.1 for detail information

16

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

Approval

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.

$0.5 \leqq T_1 \leqq 10ms$
$0 \leqq T_2 \leqq 50ms$
$0 \leqq T_3 \leqq 50ms$
$500ms \leqq T_4$

LVDS Signals

$0 \leqq T_7 \leqq T2$
$0 \leqq T_8 \leqq T3$

Option Signals
(SELLVDS, ODSEL)

Backlight (Recommended)
$500ms \leqq T_5$
$100ms \leqq T_6$

0.9Vcc
0.1Vcc
0V
0.9Vcc
0.1Vcc
Power On
Power Off
VALID
50%   50%

Power ON/OFF Sequence

17

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

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}	12.0	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
Lamp Current	I_L	9.0 ± 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"	-	0.646	-	-	(0),(5)
		Rcy			0.330		-	
	Green	Gcx			0.271		-	
		Gcy			0.593		-	
	Blue	Bcx			0.144		-	
		Bcy			0.063		-	
	White	Wcx			0.279		-	
		Wcy			0.287		-	
Center Transmittance		T%	θ_x=0°, θ_Y =0°	-	5.0	-	%	(1),(7)
Contrast Ratio		CR	with CMO module		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			

18

Version 2.0

Approval

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-L01) 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
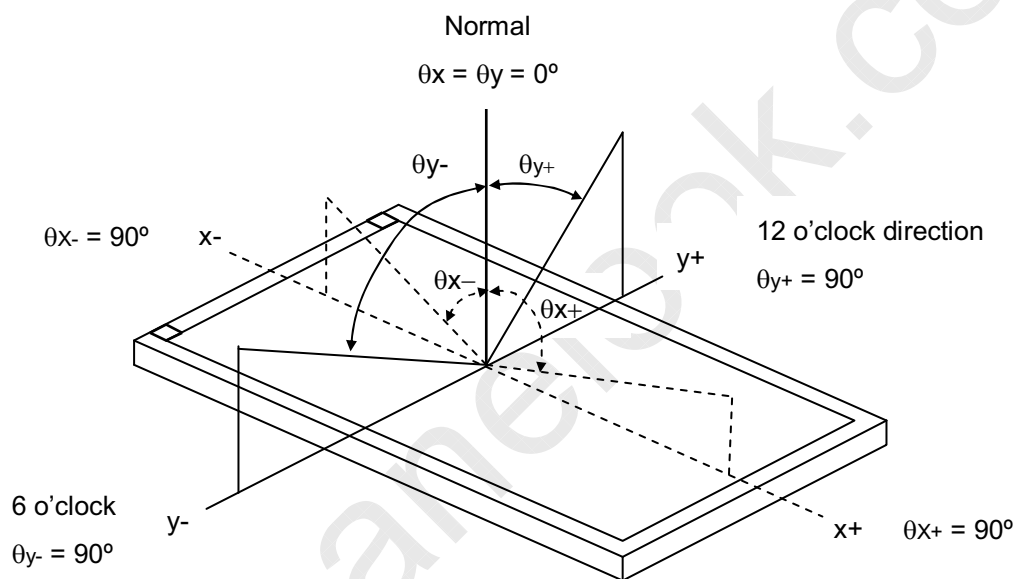
Note (3) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.
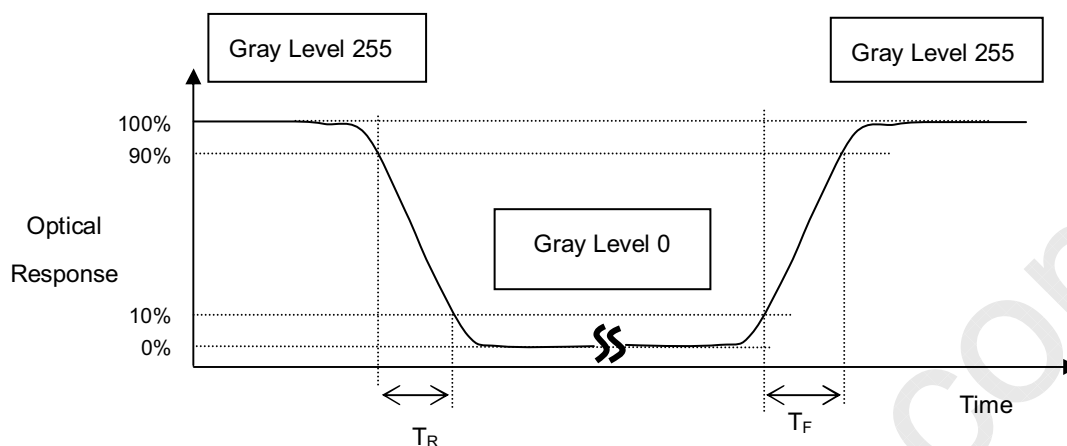
Contrast Ratio (CR) = L255 / L0

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
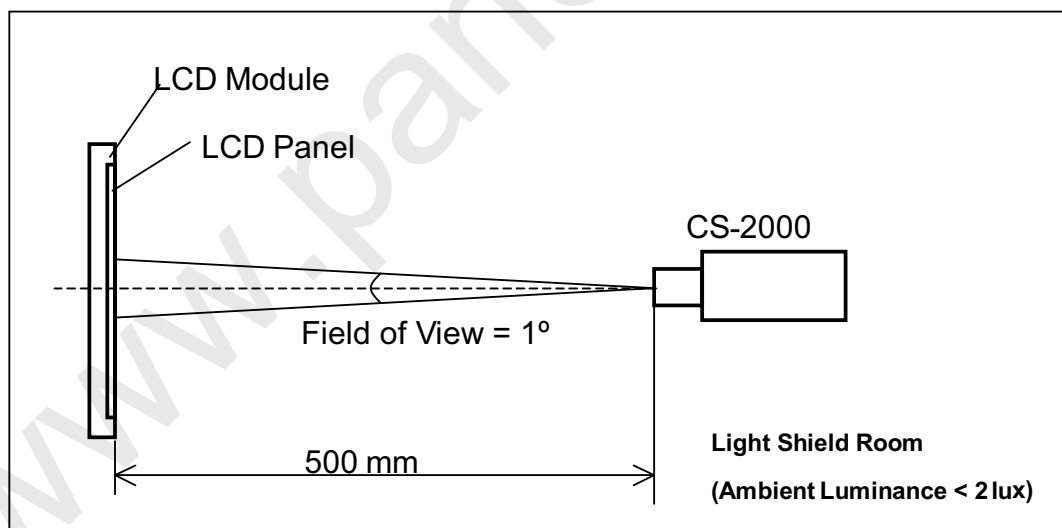
Note (6).

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

Approval

Note (4) Definition of Response Time (T_R, T_F):

Gray Level 255   Gray Level 255

100%
90%

Optical

Response   Gray Level 0

10%
0%

T_R T_F Time

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.

LCD Module

LCD Panel

CS-2000

Field of View = 1º

500 mm

Light Shield Room

(Ambient Luminance < 2 lux)

Version 2.0

Approval

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)]

Horizontal Line

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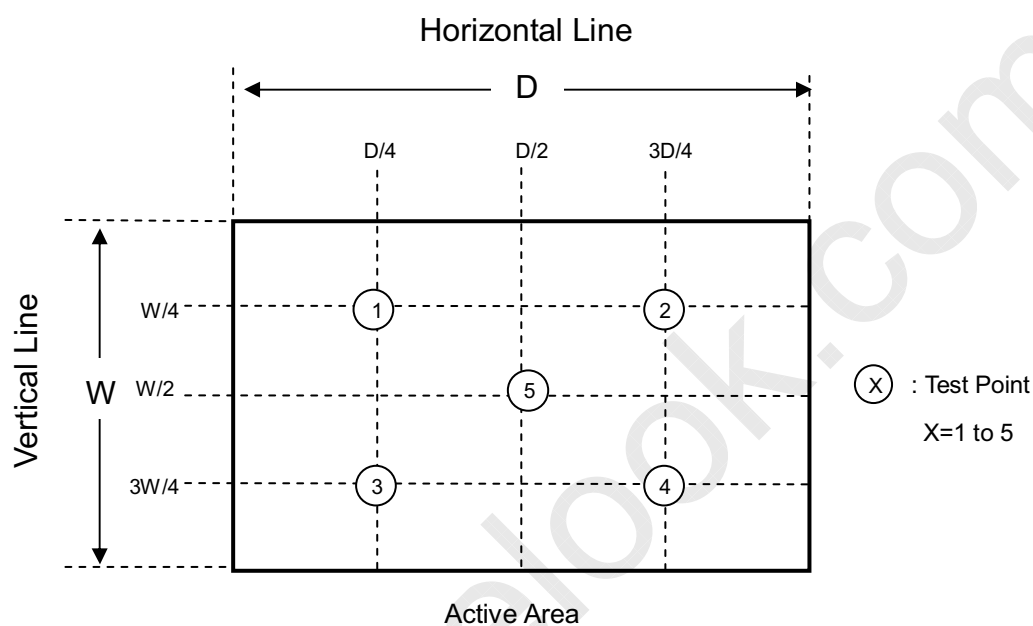
Note (7) Definition of Transmittance (T%) :

　　　Module is without signal input.

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

21

Version 2.0

Approval
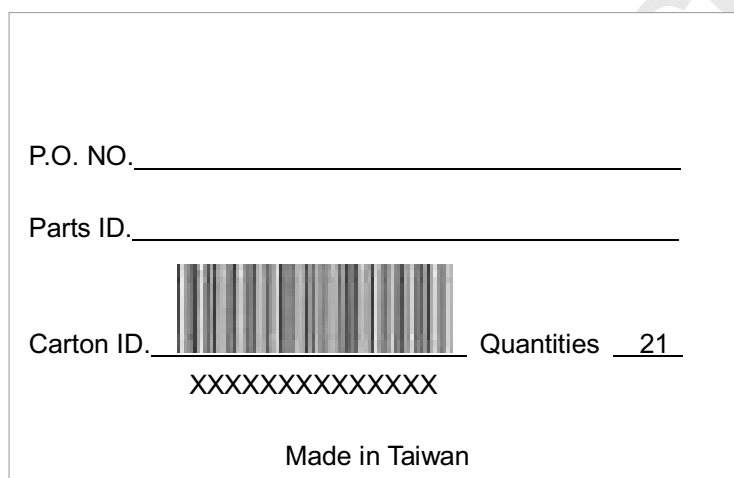
8. DEFINITION OF LABELS

8.1 OPEN CELL LABEL

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

V260B3-P01

XXXXXXXXXXXXX

V260B3-P01 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– P01

(b)   Carton ID: CMO internal control

(c)   Quantities: 21

Version 2.0

Approval

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

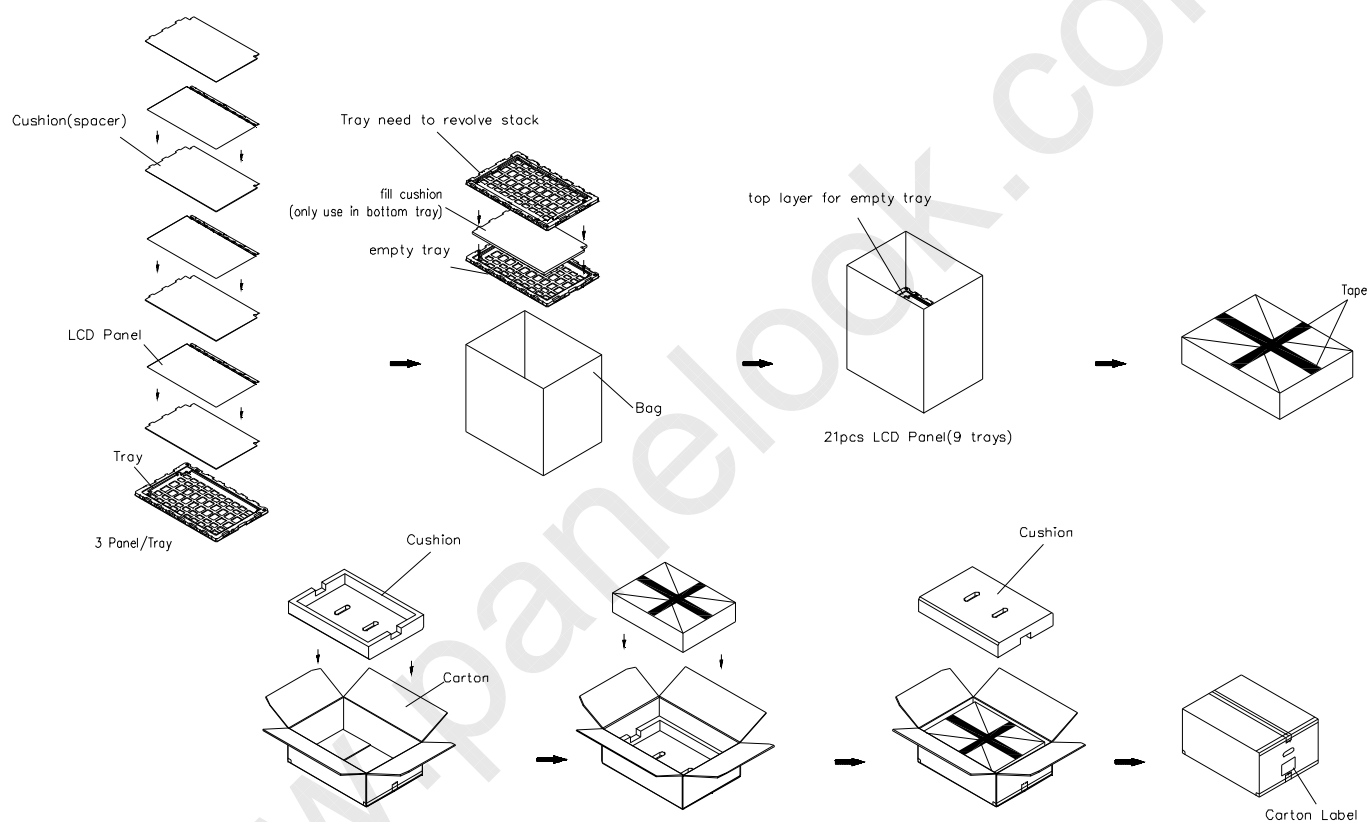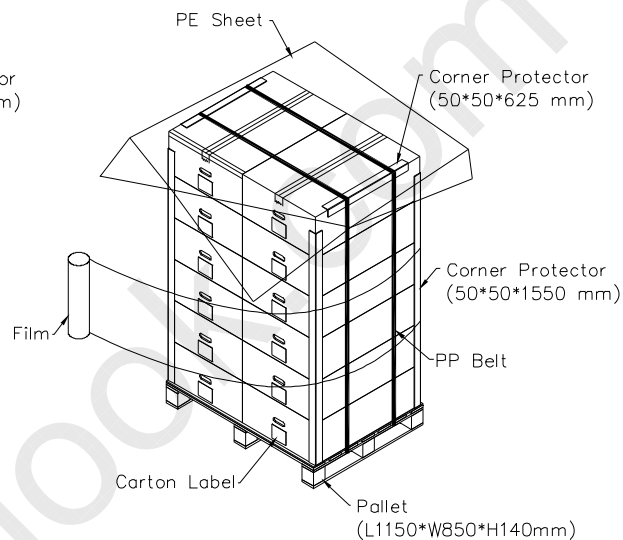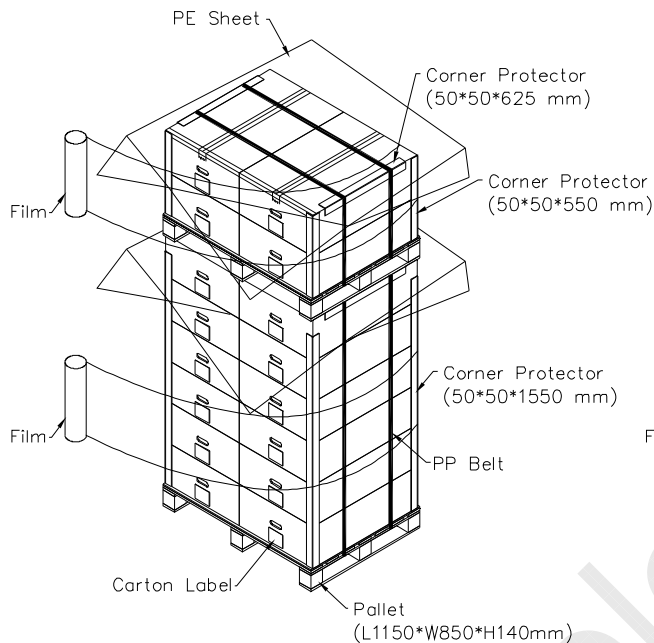### 9.2 PACKING METHOD

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

Figure.9-1 packing method

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

Approval

Sea / Land Transportation
(40ft HQ Container)

Sea / Land Transportation
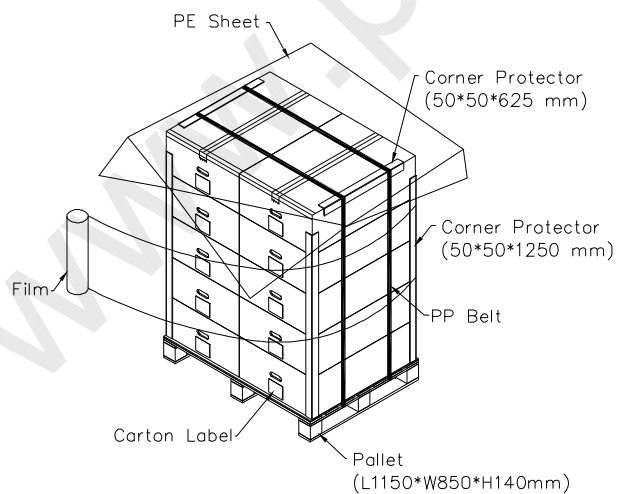(40ft Container)

Air Transportation

Figure.9-2 packing method

Version 2.0

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.

Version 2.0

Issued Date: 3, Dec. 2009
Model No.: V260B3– P01

Approval

11. MECHANICAL CHARACTERISTICS

26

Version 2.0