

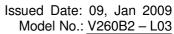
# TFT LCD Approval Specification MODEL NO.: V260B2 – L03

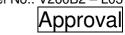
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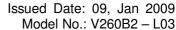
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# **REVISION HISTORY**

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



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#### 1. GENERAL DESCRIPTION

#### 1.1 OVERVIEW

V260B2- L03 is a TFT Liquid Crystal Display module with 4U-CCFL Backlight unit and 1ch-LVDS interface. The display diagonal is 26". This module supports 1366 x 768 WXGA format and can display 16.7M colors (6-bit+Hi-FRC).

#### **1.2 FEATURES**

- Optimized Brightness 450nits
- Contrast Ratio 800:1
- Fast Response Time 5ms
- Color Saturation NTSC 72%
- WXGA (1366 x 768 pixels) Resolution
- DE (Data Enable) Only Mode
- LVDS (Low Voltage Differential Signaling) Interface
- Viewing Angle: 160(H)/150(V) (CR>10) TN Technology
- -Color Reproduction (Nature Color)

#### 1.3 APPLICATION

- TFT LCD TVs
- Optimized Brightness, Multi-Media Displays

#### 1.4 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Active Area	575.769 (H) x 323.712 (V) (26" Diagonal)	mm	(1)
Bezel Opening Area	580.8 (H) x 328.8 (V)	mm	(1)
Driver Element	a-si TFT Active Matrix	_	
Pixel Number	1366 x R.G.B. x 768	pixel	
Pixel Pitch (Sub Pixel)	0.1405 (H) x 0.4215 (V)	mm	
Pixel Arrangement	RGB Vertical Stripe	_	
Display Colors	16.7M	color	
Display Operation Mode	Transmissive Mode / Normally White	_	
Surface Treatment	Anti-Glare Coating (Haze 25%) Hard Coating (3H)	_	

#### 1.5 MECHANICAL SPECIFICATIONS

Ite	em	Min.	Тур.	Max.	Unit	Note
	Horizontal(H)	625	626	627	mm	
Module Size	Vertical(V)	372	373	374	mm	
	Depth(D)	31	32	33	mm	To Rear
Weight		3195	3445	3695	g	

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



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#### 2. ABSOLUTE MAXIMUM RATINGS

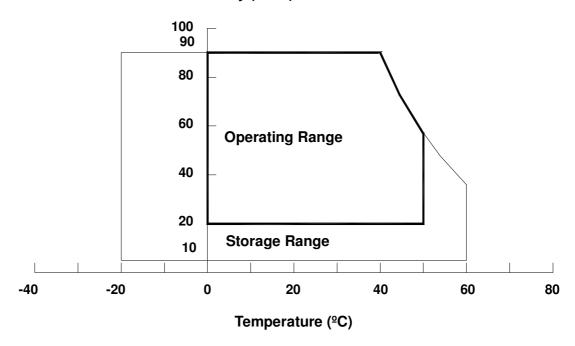
#### 2.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Va	Unit	Note		
item	Syllibol	Min.	Max.	Offit	Note	
Storage Temperature	T <sub>ST</sub>	-20	+60	ōC	(1)	
Operating Ambient Temperature	T <sub>OP</sub>	0	+50	oC	(1), (2)	
Shock (Non-Operating)	S <sub>NOP</sub>	_	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  $\leq$  40  $^{\circ}$ C).
- (b) Wet-bulb temperature should be 39  $^{\circ}$ C Max. (Ta > 40  $^{\circ}$ C).
- (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 °C 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 °C. 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  $\pm X$ ,  $\pm Y$ ,  $\pm Z$ .
- 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)**





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#### 2.2 ELECTRICAL ABSOLUTE RATINGS

#### 2.2.1 TFT LCD MODULE

Item	Symbol Value		lue	Unit	Note
	Symbol	Min.	Max.	Offic	Note
Power Supply Voltage	Vcc	-0.3	13.0	V	(1)
Input Signal Voltage	VIN	-0.3	3.6	V	(1)

#### 2.2.2 BACKLIGHT UNIT

Item	Symbol	Test Condition	Min.	Туре	Max.	Unit	Note
Lamp Voltage	$V_W$	Ta = 25 °C	_	_	3000	$V_{RMS}$	
Power Supply Voltage	$V_{BL}$	_	0	_	30	٧	(1)
Control Signal Level	_	_	-0.3	_	7	٧	(2), (3)

- Note (1) Permanent damage to the device may occur if maximum values are exceeded. Functional operation should be restricted to the conditions described under normal operating conditions.
- Note (2) No moisture condensation or freezing.
- Note (3) The control signals includes Backlight On/Off Control, Internal PWM Control and External PWM Control.



#### 3. ELECTRICAL CHARACTERISTICS

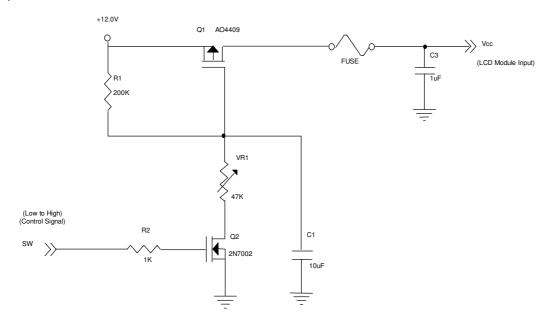
# 3.1 TFT LCD MODULE

 $Ta = 25 \pm 2 \,{}^{\circ}C$ 

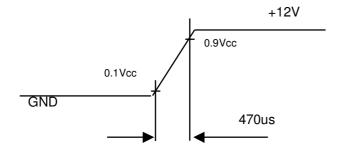
Parameter		Symbol		Value	Unit	Note		
		Syllibol	Min.	Тур.	Max.	Offic	Note	
Power Su	pply Voltage		$V_{CC}$	11.4	12.0	12.6	V	(1)
Power Su	pply Ripple Vo	ltage	$V_{RP}$	_		300	mV	
Rush Curi	rent		I <sub>RUSH</sub>	_	_	3.0	Α	(2)
		White		_	0.2	0.25	Α	
Power Su	pply Current	Black	$I_{CC}$	_	0.5	0.55	Α	(3)
		Vertical Stripe		_	0.4	0.45	Α	
L)/DC	Differential In Threshold Vol		$V_{LVTH}$	+100	_	_	mV	
LVDS Dif		Differential Input Low Threshold Voltage		_	_	-100	mV	
	Common Inpu	ıt Voltage	$V_{LVC}$	1.125	1.25	1.375	V	
	Terminating Resistor		$R_T$	_	100		ohm	
CMOS Input High Thr		reshold Voltage	$V_{IH}$	2.7	_	3.3	V	
interface	Input Low Thr	eshold Voltage	V <sub>IL</sub>	0	_	0.7	V	

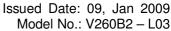
Note (1) The module should be always operated within above ranges.

#### Note (2) Measurement Conditions:



# Vcc rising time is 470us

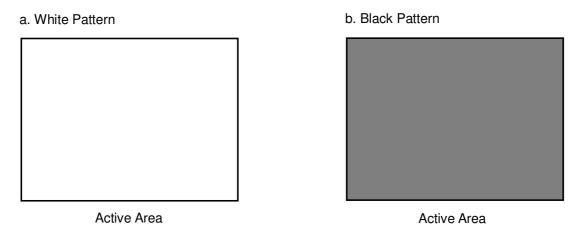




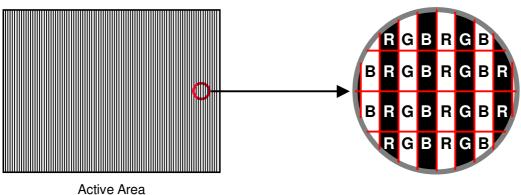




Note (3) The specified power supply current is under the conditions at Vcc = 12 V, Ta = 25  $\pm$  2  $^{\circ}$ C, f<sub>v</sub> = 60 Hz, whereas a power dissipation check pattern below is displayed.



## c. Vertical Stripe Pattern



#### 3.2 BACKLIGHT UNIT

# 3.2.1 CCFL (Cold Cathode Fluorescent Lamp) CHARACTERISTICS (Ta = 25 ± 2 °C)

Parameter	Symbol		Value	Unit	Note	
rafameter	Syllibol	Min. Typ. Max.		Ullit	INOLE	
Lamp Voltage	$V_W$	ı	1415	-	$V_{RMS}$	$I_L = 6.5 \text{mA}$
Lamp Current(HI-Side)	ال	6.0	6.5	7.0	$mA_{RMS}$	-
Lamp Ctarting Valtage	Vs	-	-	1660	$V_{RMS}$	(1), Ta = 0 <sup>o</sup> C
Lamp Starting Voltage		-	-	1600	$V_{RMS}$	(1), Ta = 25 <sup>o</sup> C
Operating Frequency	Fo	40	-	80	KHz	(2)
Lamp Life Time	$L_BL$	50,000		-	Hrs	(3)



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Note (1) The lamp starting voltage V<sub>S</sub> should be applied to the lamp for more than 1 second under starting up duration. Otherwise the lamp could not be lighted on completed.

- Note (2) 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 (3) The life time of a lamp is defined as when the brightness is larger than 50% of its original value and the effective discharge length is longer than 80% of its original length (Effective discharge length is defined as an area that has equal to or more than 70% brightness compared to the brightness at the center point.) as the time in which it continues to operate under the condition Ta =  $25 \pm 2^{\circ}$ C and I<sub>L</sub> =  $6.0^{\sim} 7.0 \text{mA}_{\text{RMS}}$ .



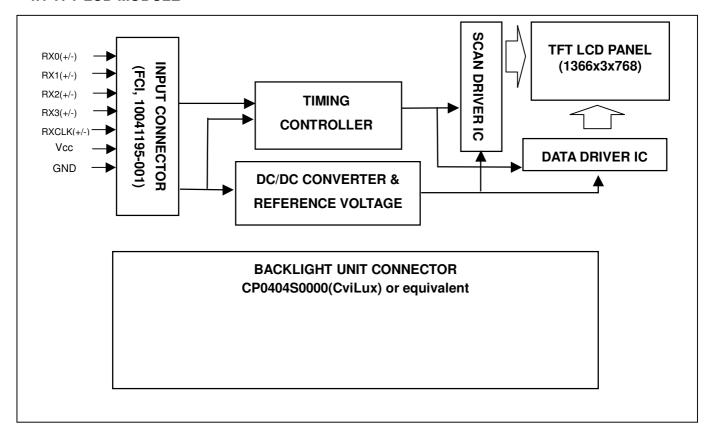
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#### 4. BLOCK DIAGRAM

#### **4.1 TFT LCD MODULE**







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#### 5. INTERFACE PIN CONNECTION

#### **5.1 TFT LCD MODULE**

## **CN1 Connector Pin Assignment**

Pin No.	Symbol	Description	Note
1	NC	No connection	(2)
2	NC	No connection	(2)
3	NC	No connection	(2)
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	NC	No connection	(2)
21	SELLVDS	Select LVDS data format	(3)
22	NC	No connection	(2)
23	GND	Ground	
24	GND	Ground	
25	GND	Ground	
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.: FCI, 10041195-001 or compatible

Note (2) Reserved for internal use. Please leave it open.

Note (3) High or OPEN: Normal, Ground: JEIDA LVDS format

Please refer to 5.4 LVDS INTERFACE (Page 14)



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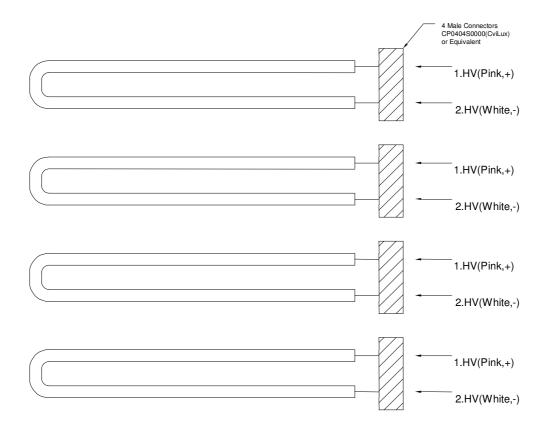
#### **5.2 BACKLIGHT UNIT**

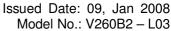
The pin configuration for the housing and leader wire is shown in the table below.

Housing: 1.CP0404S0000(CviLux)

Pin No.	Symbol	Description	Wire Color
1	HV	High Voltage	Pink
2	HV	High Voltage	White

Note (1) The backlight interface housing for high voltage side is a model 1. CP0404S0000(CviLux) or Equivalent.

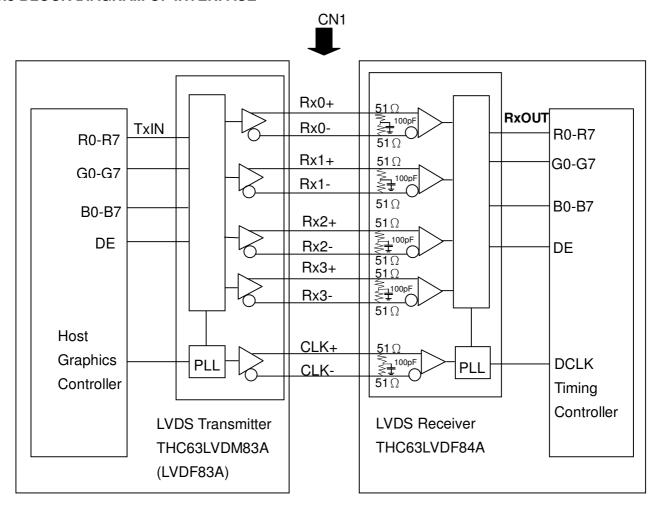




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#### **5.3 BLOCK DIAGRAM OF INTERFACE**



R0~R7 : Pixel R Data G0~G7 : Pixel G Data B0~B7 : Pixel B Data

DE: Data Enable Signal

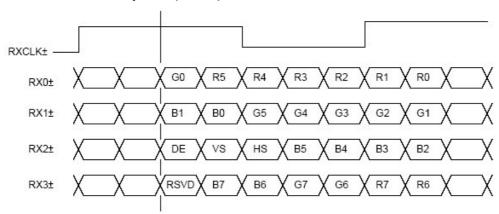
Note (1) The system must have the transmitter to drive the module.

Note (2) LVDS cable impedance shall be 50 ohms per signal line or about 100 ohms per twist-pair line when it is used differentially.

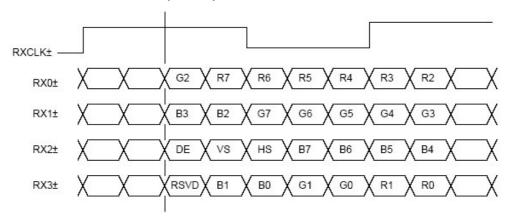


#### **5.4 LVDS INTERFACE**

#### SELLVDS = H or Open (VESA)



#### SELLVDS = L (JEIDA)



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".



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#### **5.5 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.

	ersus data iriput.											D.	ato 1	Sigr	201										
	Color				Re	ad .						Di		oigi reer							Blı	10			
	Ooloi		R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	В6	B5	B4	B3	B2	B1	В0
	Black	R7	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
Basic	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
Colors	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
001010	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
	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
Gray				:	:	:	:			:	:	:	:	:	:	:	:	:	:		:	:	:		
Scale		:		:			:	:	:	:	:	:	:	:		:	:	:	:		:	:	:	:	
Of	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	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
	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
Gray	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Scale	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Of	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	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
	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
Cuar	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
Gray	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Scale Of	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Blue	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
Diue	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

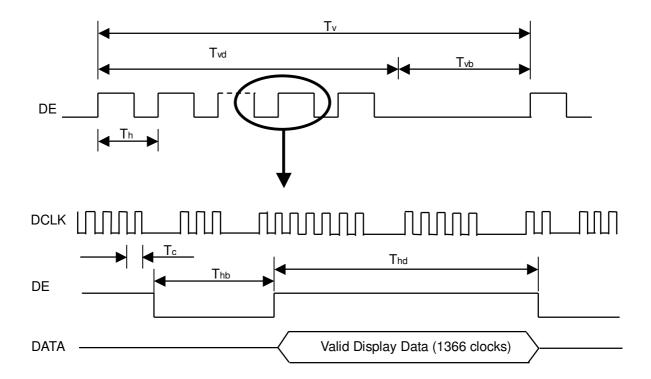
#### **6.1 INPUT SIGNAL TIMING SPECIFICATIONS**

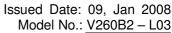
The input signal timing specifications are shown as the following table and timing diagram.

Signal	Item	Symbol	Min.	Тур.	Max.	Unit	Note
	Frequency	1/Tc	60	76	82	MHz	
LVDS Receiver Clock	Input cycle to	Trcl			200	nc	
	cycle jitter	1101			200	ps	
LVDS Receiver Data	Setup Time	Tlvsu	600	ı		ps	
LVD3 Neceiver Data	Hold Time	Tlvhd	600	ı		ps	
	Frame Rate	Fr5	47	50	53	Hz	
	i rame nate	Fr6	57	60	63	Hz	
Vertical Active Display Term	Total	Tv	778	806	888	Th	Tv=Tvd+Tvb
	Display	Tvd	768	768	768	Th	-
	Blank	Tvb	10	38	120	Th	-
	Total	Th	1442	1560	1936	Tc	Th=Thd+Thb
Horizontal Active Display Term	Display	Thd	1366	1366	1366	Тс	-
	Blank	Thb	76	194	570	Tc	-

Note (1) Since this module is operated in DE only mode, Hsync and Vsync input signals should be set to low logic level. Otherwise, this module would operate abnormally.

#### **INPUT SIGNAL TIMING DIAGRAM**

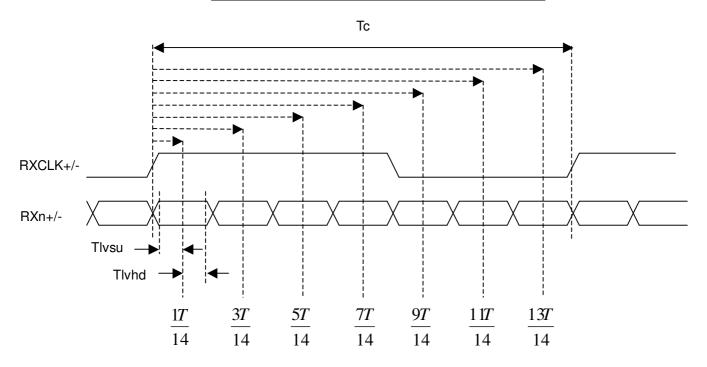


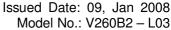


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# LVDS RECEIVER INTERFACE TIMING DIAGRAM



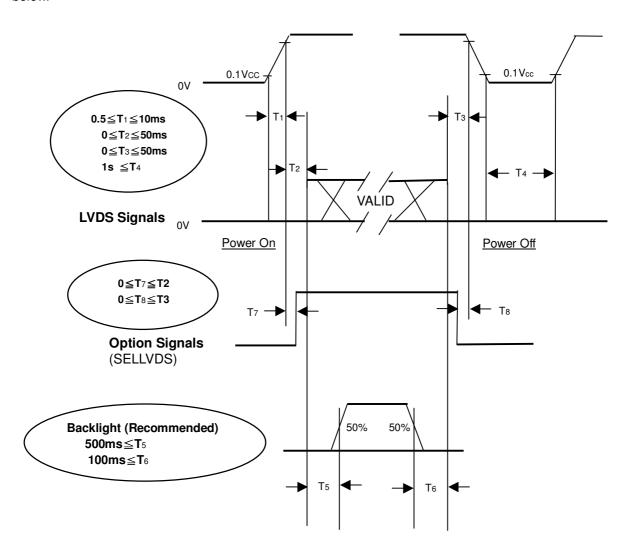


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#### **6.2 POWER ON/OFF SEQUENCE**

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

- Note (1) The supply voltage of the external system for the module input should follow the definition of Vcc.
- Note (2) Apply the lamp voltage within the LCD operation range. When the backlight turns on before the LCD operation or the LCD turns off before the backlight turns off, the display may momentarily become abnormal screen.
- Note (3) In case of Vcc is in off level, please keep the level of input signals on the low or high impedance. If T2<0,that maybe cause electrical overstress failure.
- Note (4) T4 should be measured after the module has been fully discharged between power off and on period.
- Note (5) Interface signal shall not be kept at high impedance when the power is on.



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#### 7. OPTICAL CHARACTERISTICS

#### 7.1 TEST CONDITIONS

Item	Symbol	Value	Unit			
Ambient Temperature	Ta	25±2	°C			
Ambient Humidity	На	50±10	%RH			
Supply Voltage	$V_{CC}$	12.0	V			
Input Signal	According to typical va	alue in "3. ELECTRICAL CHARACTERISTICS				
Lamp Current	$I_L$	$6.5 \pm 0.5$	mA			
Oscillating Frequency (Inverter)	F <sub>W</sub>	58 ± 3	KHz			
Vertical Frame Rate	Fr	60	Hz			

#### 7.2 OPTICAL SPECIFICATIONS

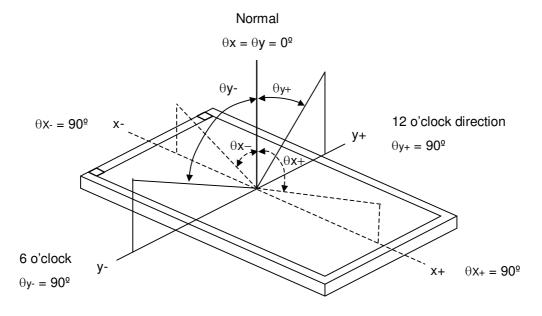
The relative measurement methods of optical characteristics are shown in 7.2. The following items should be measured under the test conditions described in 7.1 and stable environment shown in Note (6).

Item		Symbol	Condition	Min.	Тур.	Max.	Unit	Note	
Contrast Ratio		CR		600	800		-	(2)	
Dean and Time		$T_R$			1.3	2.2		(0)	
Response Tim	e	$T_F$			3.7	5.8	ms	(3)	
Center Lumina	nce of White	L <sub>C</sub>		350	450			(4)	
White Variation	า	δW	$\theta_x=0^\circ, \theta_Y=0^\circ$			1.3	-	(7)	
Cross Talk		CT	$0_{x}=0$ , $0_{Y}=0$			4	%	(5)	
	Red	Rx	Viewing Normal		0.643		-	(6)	
	neu	Ry	Angle	Typ. -0.03	0.333	Typ. +0.03	-		
	Green	Gx	Aligie		0.272		-		
Color		Gy			0.593		-		
Chromaticity	Blue	Bx			0.150		-		
Chilomaticity		Ву			0.064		-		
	White	Wx			0.280		Target		
		Wy			0.290		Target		
	Color Gamut	CG		68	72		%	NTSC	
	Horizontal	$\theta_{x}$ +		70	80				
Viewing	Horizoniai	$\theta_{x}$ -	OD: 10	70	80		Dog	(1)	
Angle	Vertical	$\theta_{Y}$ +	CR≥10	70	80		Deg.	(1)	
	vertical	$\theta_{Y}$ -		60	70	-			



Note (1) Definition of Viewing Angle ( $\theta x$ ,  $\theta y$ ):

Viewing angles are measured by EZ-Contrast 160R (Eldim)



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

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L255 / L0

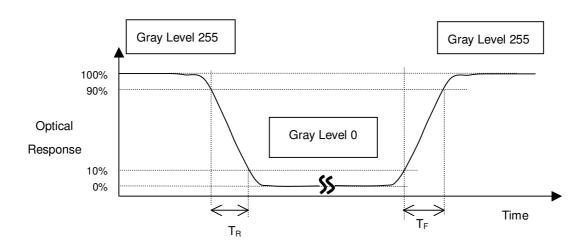
L255: Luminance of gray level 255

L 0: Luminance of gray level 0

CR = CR(5),

CR (X) is corresponding to the Contrast Ratio of the point X at the figure in Note (7).

#### Note (3) Definition of Response Time (T<sub>R</sub>, T<sub>F</sub>):







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#### Note (4) Definition of Luminance of White (L<sub>C</sub>):

Measure the luminance of gray level 255 at center point and 5 points

$$L_C = L(5)$$

L(X) is corresponding to the luminance of the point X at the figure in Note (7).

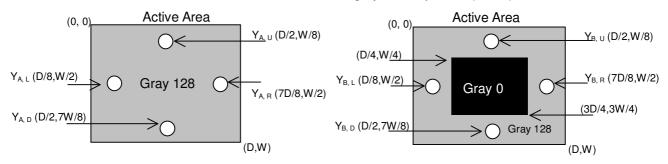
#### Note (5) Definition of Cross Talk (CT):

$$CT = | Y_B - Y_A | / Y_A \times 100 (\%)$$

Where:

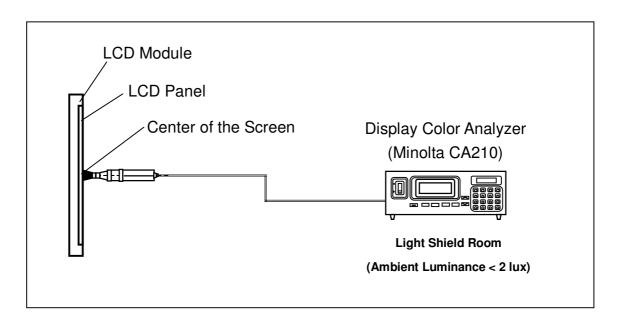
 $Y_A$  = Luminance of measured location without gray level 0 pattern (cd/m<sup>2</sup>)

Y<sub>B</sub> = Luminance of measured location with gray level 0 pattern (cd/m<sup>2</sup>)



#### Note (6) 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.



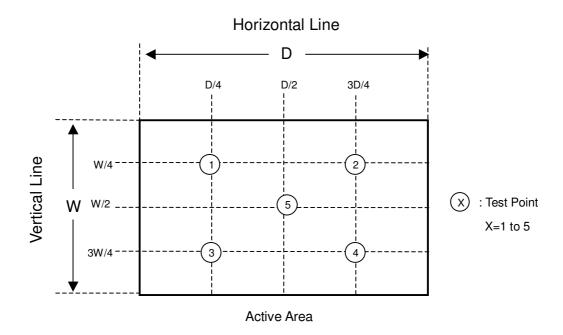


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Note (7) Definition of White Variation ( $\delta W$ ):

Measure the luminance of gray level 255 at 5 points

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



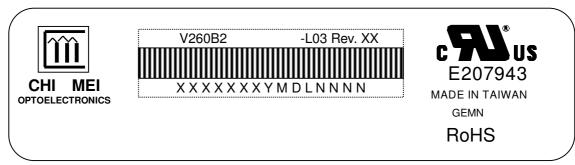


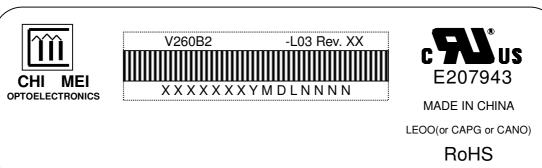
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#### 8. DEFINITION OF LABELS

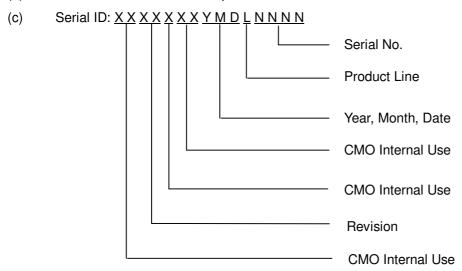
#### **8.1 CMO MODULE LABEL**

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





- (a) Model Name: V260B2-L03
- (b) Revision: Rev. XX, for example: A0, A1... B1, B2... or C1, C2...etc.



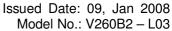
Serial ID includes the information as below:

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

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

Day: 1~9, A~Y, for 1<sup>st</sup> to 31<sup>st</sup>, exclude I,O, and U.

- (b) Revision Code: Cover all the change
- (c) Serial No.: Manufacturing sequence of product
- (d) Product Line: 1 -> Line1, 2 -> Line 2, ...etc.







#### 9. PACKAGING

#### 9.1 PACKING SPECIFICATIONS

(1) 7 LCD TV modules / 1 Box

(2) Box dimensions: 713(L)x429(W)x453(H)mm

(3) Weight: approximately 27.68 Kg (7 modules per box)

#### 9.2 PACKING METHOD

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

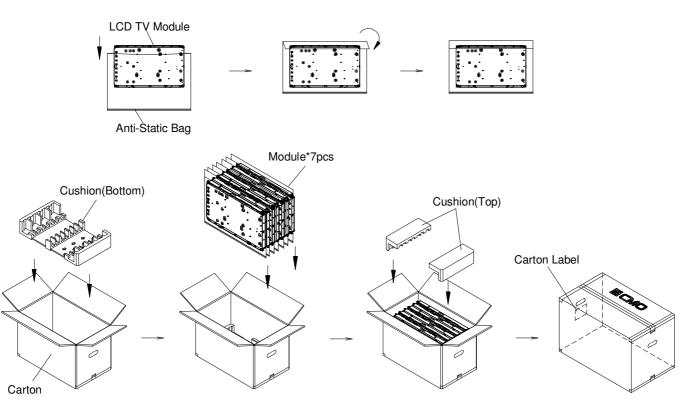
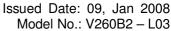


Figure.9-1 packing method

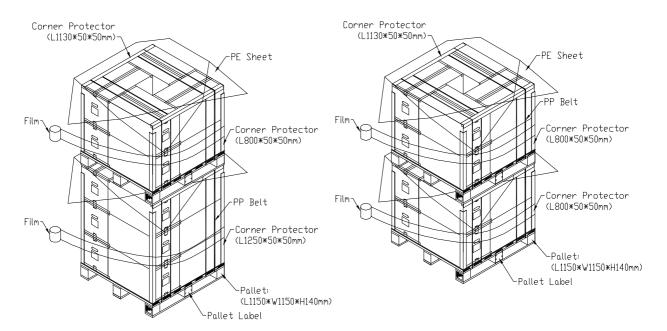






# Sea / Land Transportation (40ft HQ Container)

# Sea / Land Transportation (40ft Container)



# Air Transportation

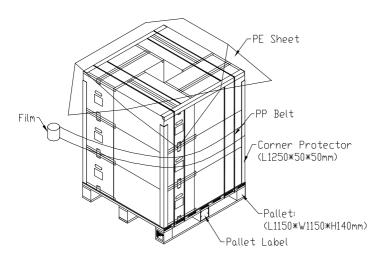


Figure.9-2 Packing method



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#### 10. PRECAUTIONS

#### 10.1 ASSEMBLY AND HANDLING PRECAUTIONS

- (1) Do not apply rough force such as bending or twisting to the module during assembly.
- (2) It is recommended to assemble or to install a module into the user's system in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.
- (3) Do not apply pressure or impulse to the module to prevent the damage of LCD panel and backlight.
- (4) Always follow the correct power-on sequence when the LCD module is turned on. This can prevent the damage and latch-up of the CMOS LSI chips.
- (5) Do not plug in or pull out the I/F connector while the module is in operation.
- (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) Moisture can easily penetrate into LCD module and may cause the damage during operation.
- (9) High temperature or humidity may deteriorate the performance of LCD module. Please store LCD modules in the specified storage conditions.
- (10) When ambient temperature is lower than 10°C, the display quality might be reduced. For example, the response time will become slow, and the starting voltage of CCFL will be higher than that of room temperature.

#### **10.2 SAFETY PRECAUTIONS**

- (1) The startup voltage of a backlight is over 1000 Volts. It may cause an electrical shock while assembling with the inverter. 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.

#### **10.3 STORAGE PRECAUTIONS**

When storing modules as spares for a long time, the following precaution is necessary.

- (1) Do not leave the module in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35°C at normal humidity without condensation.
- (2) The module shall be stored in dark place. Do not store the TFT-LCD module in direct sunlight or fluorescent light.

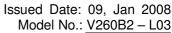


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# 11. REGULATORY STANDARDS

# **11.1 SAFETY**

Regulatory	Item	Standard
	UL	UL 60950-1: 2003
Information Technology equipment	cUL	CAN/CSA C22.2 No.60950-1-03
	СВ	IEC 60950-1:2001
	UL	UL 60065: 2003
Audio/Video Apparatus	cUL	CAN/CSA C22.2 No.60065-03
	СВ	IEC 60065:2001







# 12. MECHANICAL CHARACTERISTICS

