☐ Tentative Specification
☐ Preliminary Specification
■ Approval Specification

MODEL NO.: V236BJ1
SUFFIX: LE2

Revision : C3/C5
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
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REVISION HISTORY

Version	Date	Page(New)	Section	Description
3.0	Jun.3 2014	All	All	The Approval Specification was first Issued.

1. GENERAL DESCRIPTION

1.1 OVERVIEW

V236BJ1-LE2 is a 23.6" TFT Liquid Crystal Display module with WLED Backlight unit and 30 pins 1ch-LVDS interface. This module supports 1366 x 768 HDTV format and can display up to 16.7M (8 bit) colors. The converter module for Backlight is not built in.

1.2 FEATURES

- High brightness (250 nits)
- High contrast ratio (3000:1)
- Fast response time (Gray to gray average 8.5 ms)
- High color saturation (NTSC 72%)
- HDTV (1366 x 768 pixels) resolution, true HDTV format
- DE (Data Enable) only mode
- LVDS (Low Voltage Differential Signaling) interface
- Optimized response time for 60 Hz frame rate
- Ultra wide Viewing Angle: Super MVA Technology
- RoHS compliance.

1.3 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Active Area	521.4705 (H) x 293.184 (V)	mm	(1)
Bezel Opening Area	525.22 (H) x 297.22 (V)	mm	
Driver Element	a-si TFT active matrix	-	-
Pixel Number	1366 x R.G.B. x 768	pixel	-
Pixel Pitch(Sub Pixel)	0.12725 (H) x 0.38175 (V)	mm	-
Pixel Arrangement	RGB vertical stripe	-	-
Power consumption	22.428 (Max.) [Cell PW 5.928 W (Max.) + BLU PW 16.500 (Max.)]	Watt	(2)
Display Colors	16.7M	color	-
Display Operation Mode	Transmissive Mode / Normally Black	-	-
Surface Treatment	Anti-Glare coating (Haze 1.0%),Hard coating (3H)	-	-

Note (1) Please refer to the attached drawings in chapter 11 for more information about the front and back outlines.

Note (2) Please refer sec 3.1 and 3.2 for more information of Power consumption.

1.4 MECHANICAL SPECIFICATIONS

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	544.3	544.8	545.3	mm	(1)(2)
	Vertical (V)	320.0	320.5	321.0	mm	
	Depth (D)	10.9	11.4	11.9	mm	
Weight		—	2.22	2.33	Kg	-

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

Note (2) Module Depth is between bezel to real.

2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	TST	-20	+60	ºC	(1)
Operating Ambient Temperature	TOP	0	50	ºC	(1), (2)
Shock (Non-Operating)	SNOP	—	50	G	(3), (5)
Vibration (Non-Operating)	VNOP	—	1.0	G	(4), (5)

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).

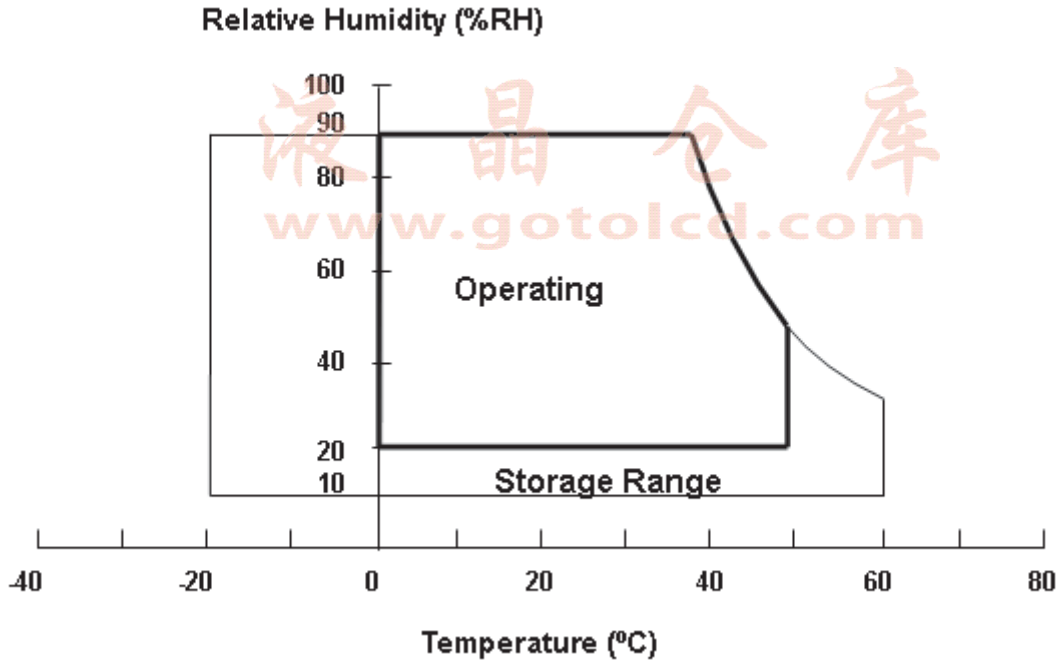
(c) No condensation.

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 70 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 70 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 ~ 200 Hz, 30 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.



2.2 PACKAGE STORAGE

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

(a) 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 ℃ at normal humidity without condensation.

(b) The module shall be stored in dark place. Do not store the TFT-LCD module in direct sunlight or fluorescent light.

2.3 ELECTRICAL ABSOLUTE RATINGS

2.3.1 TFT LCD MODULE

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

2.3.2 BACKLIGHT CONVERTER UNIT

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
LED Forward Current Per Input Pin	I_F	—	230	243.8	mA	(1) (2) Duty=100%
LED Pulse Forward Current Per Input Pin	I_{FP}	—	—	450	mA	Pulse Width≦10msec. and Duty≦25%

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 input pin of LED light bar at Ta=25±2 ℃ (Refer to 3.2 for further information).

3. ELECTRICAL CHARACTERISTICS

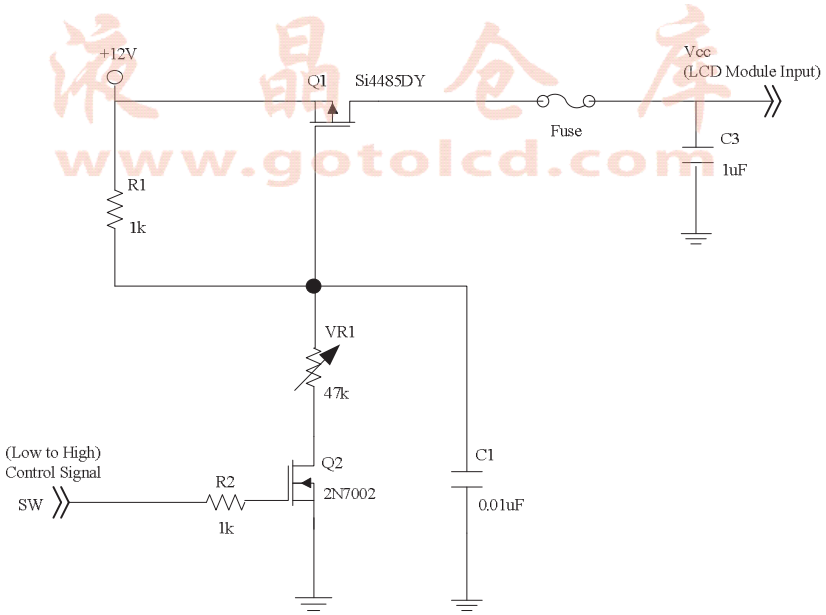
3.1 TFT LCD MODULE

(Ta = 25 ± 2 ºC)

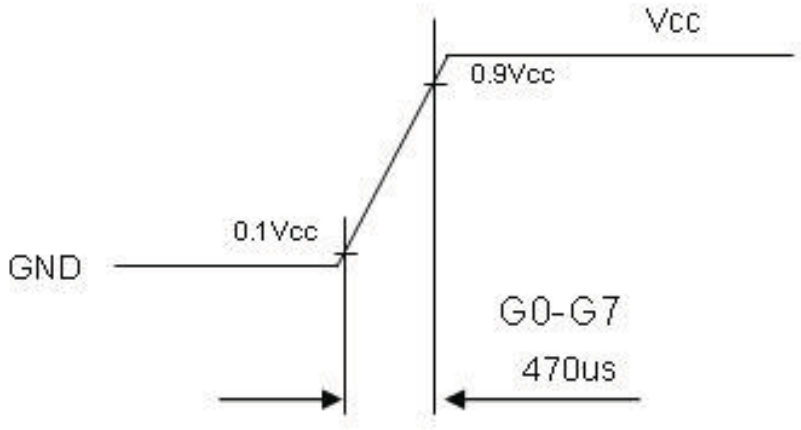
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V_{CC}	10.8	12	13.2	V	(1)
Rush Current		I_{RUSH}	—	—	3.614	A	(2)
Power consumption		P_T	—	4.176	5.928	Watt	(3)
Power Supply Current	White Pattern	—	—	0.348	0.403	A	(4)
	Horizontal Stripe	—	—	0.312	0.348	A	
	Black Pattern	—	—	0.216	0.26	A	
LVDS interface	Differential Input High Threshold Voltage	V_{LVTH}	+100	—	+300	mV	(5)
	Differential Input Low Threshold Voltage	V_{LVTL}	-300	—	-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	
CMIS 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 the above ranges.

Note (2) Measurement condition:



Vcc rising time is 470us



Note (3) The Specified Power consumption is under White pattern.

Note (4) 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.

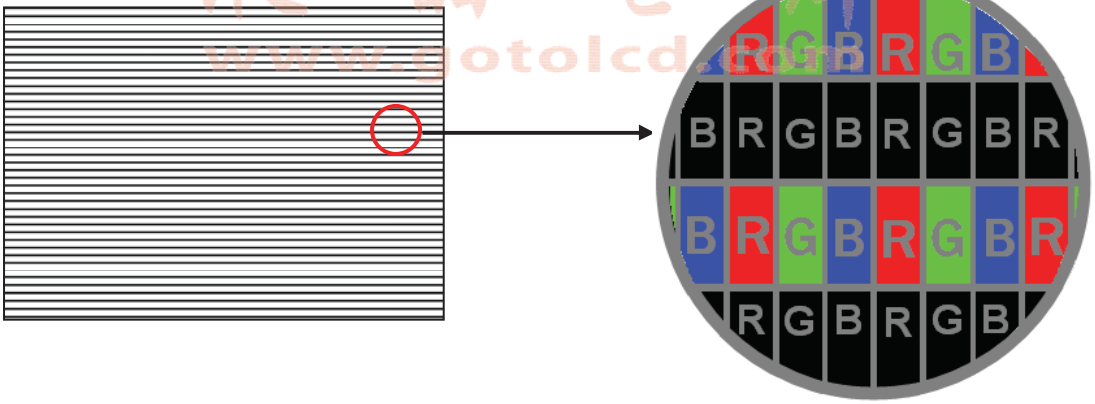
a. White Pattern

Active Area

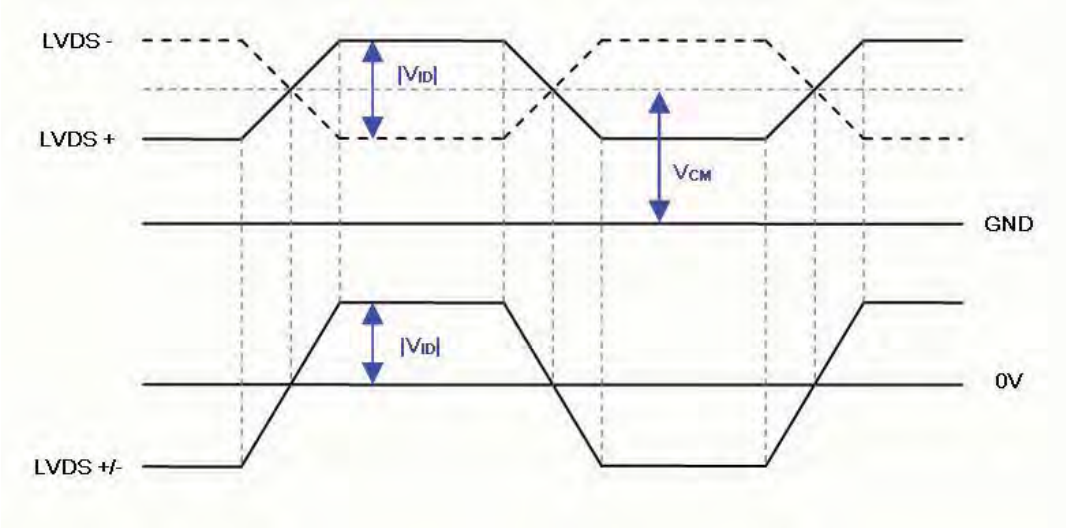
b. Black Pattern

Active Area

c. Horizontal Pattern



Note (5) The LVDS input characteristics are as follows :



3.2 BACKLIGHT CONNECTOR PIN CONFIGURATION

3.2.1 LED LIGHT BAR CHARACTERISTICS

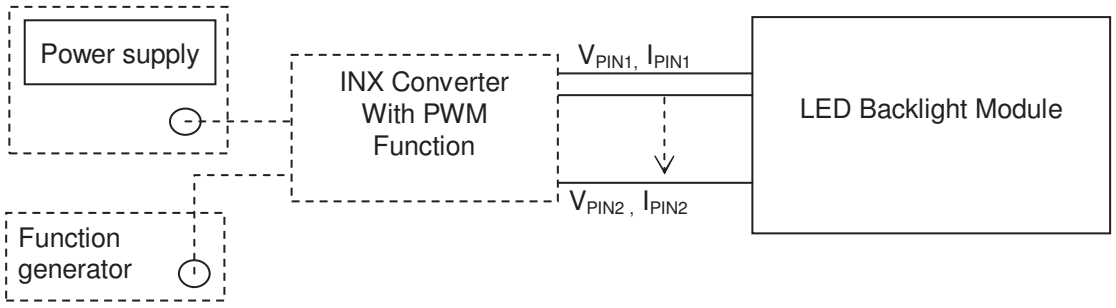
(Ta = 25 ± 2 ºC)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
LED Light Bar Input Voltage Per Input Pin	V_{PIN}	26.91	31.23	35.55	V	(1), Duty=100%, I_L = 230mA
LED Light Bar Current Per Input Pin	I_{PIN}	—	230	243.8	mA	(1), (2) Duty=100%
Power consumption	P_{BL}	—	14.5	16.5	W	(1), (2) Duty=100%, I_L = 230mA
LED Life time	L_{LED}	30,000	—	—	Hrs	(3)

Note (1) LED light bar input voltage and current are measured by utilizing a true RMS multimeter as shown below:

Note (2) P_{BL}(Typ.)= I_{PIN}(Typ.) × V_{PIN}(Typ.) × (2), P_{BL}(Max.)= I_{PIN}(Typ) × V_{PIN}(Max.) × (2) input pins ,

Note (3)The lifetime of LED is defined as the time when LED packages continue to operate under the conditions at Ta = 25 ±2 ℃ and (I= 200mA) (per chip) until the brightness becomes ≦ 50% of its original value.



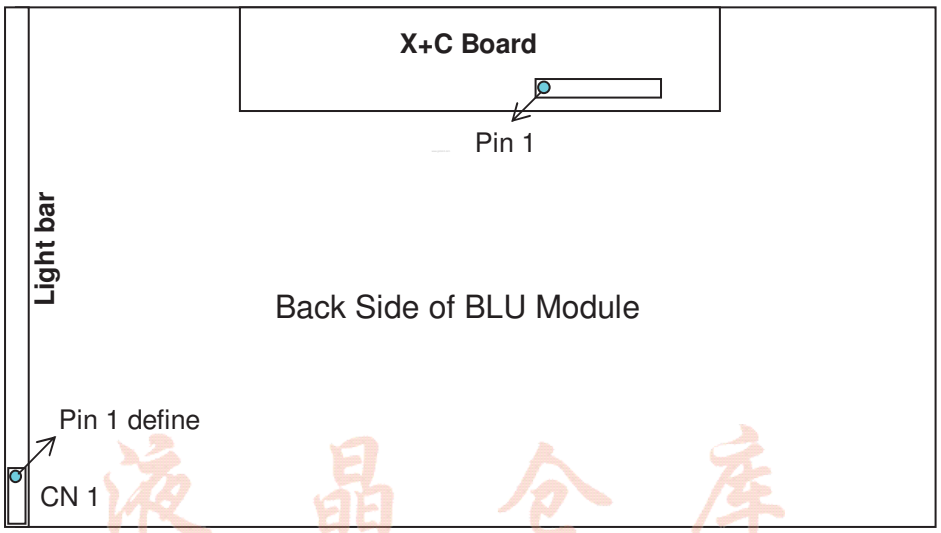
3.2.2 LIGHTBAR CONNECTOR PIN ASSIGNMENT

Connector: CI1406M1HRK-NH (CviLux)

Input connector pin assignment: CN1

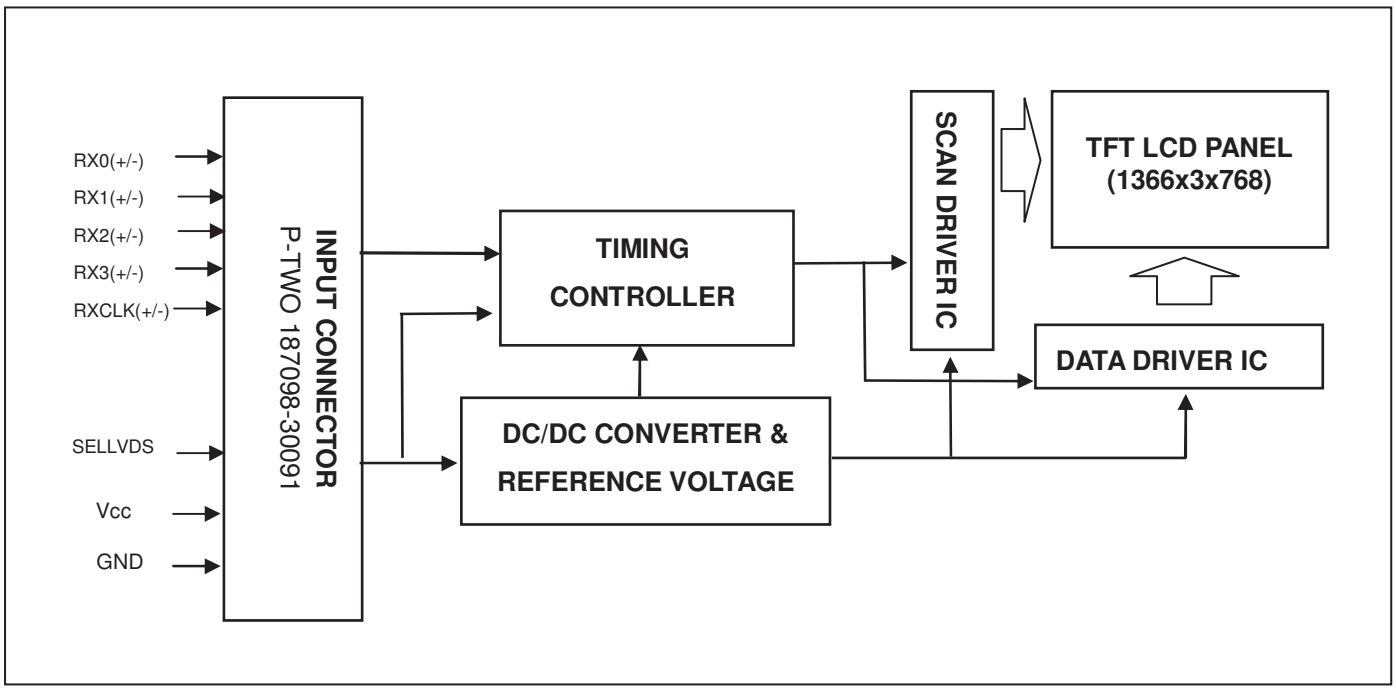
Input connector CN1		Comments
(vendor) CviLux	(type) CI1406M1HRK-NH	
Pin	Function	
1	VLED	VLED
2	NC	Not connection, this pin should be open
3	NC	Not connection, this pin should be open
4	NC	Not connection, this pin should be open
5	LED2	Cathode of LED string
6	LED1	Cathode of LED string

3.3 LVDS INPUT SIGNAL SPECIFICATIONS



4. BLOCK DIAGRAM OF INTERFACE

4.1 TFT LCD MODULE



5. INPUT TERMINAL PIN ASSIGNMENT

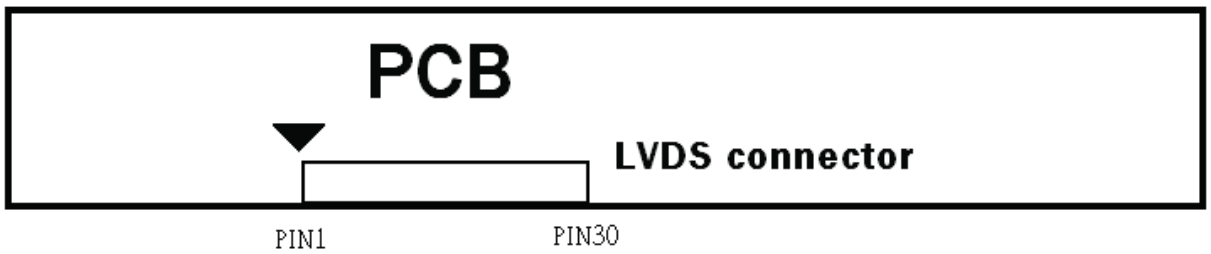
5.1 TFT LCD MODULE INPUT

Connector Pin Assignment

Pin	Name	Description	Remark
1	NC	No connection	(2)
2	SCL	I2C Bus of TCON	
3	SDA	I2C Bus of TCON	
4	GND	Ground	
5	RX0-	Negative LVDS differential data input. Channel 0	
6	RX0+	Positive LVDS differential data input. Channel 0	
7	GND	Ground	
8	RX1-	Negative LVDS differential data input. Channel 1	
9	RX1+	Positive LVDS differential data input. Channel 1	
10	GND	Ground	
11	RX2-	Negative LVDS differential data input. Channel 2	
12	RX2+	Positive LVDS differential data input. Channel 2	
13	GND	Ground	
14	RXLCK-	Negative LVDS differential clock input.	
15	RXCLK+	Positive LVDS differential clock input.	
16	GND	Ground	
17	RX3-	Negative LVDS differential data input. Channel 3	
18	RX3+	Positive LVDS differential data input. Channel 3	
19	GND	Ground	
20	NC	No connection	(2)
21	SELLVDS	Select LVDS Format	(3)
22	WP	EEPROM Write Protection	(4)
23	GND	Ground	
24	GND	Ground	
25	GND	Ground	
26	VCC	+12.0V power supply	
27	VCC	+12.0V power supply	
28	VCC	+12.0V power supply	
29	VCC	+12.0V power supply	
30	VCC	+12.0V power supply	

Note (1) Connector type: (P-TWO=187098-30091)

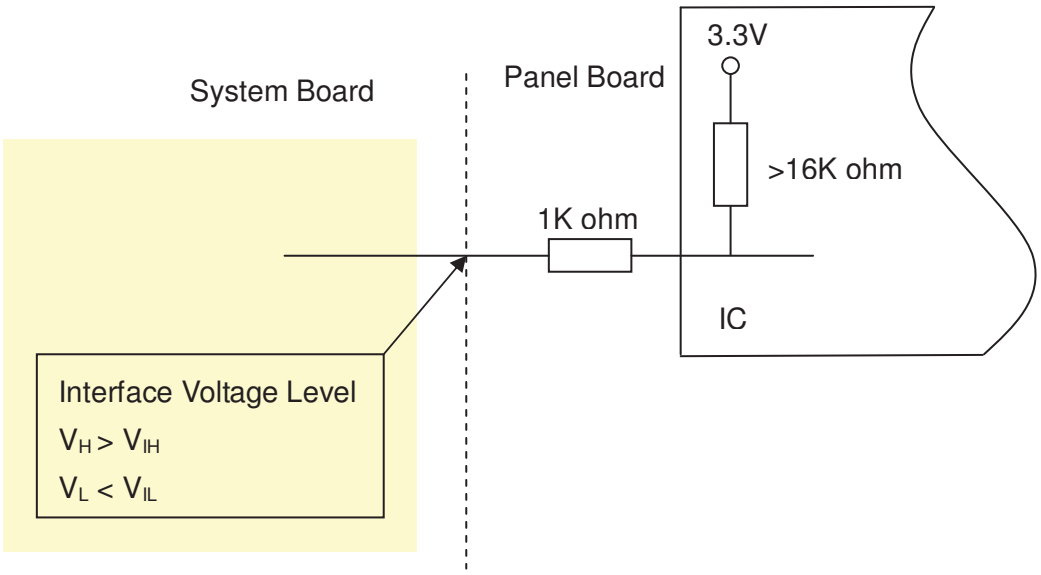
LVDS connector pin order defined as follows



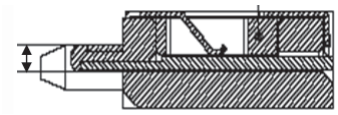
Note (2) Reserved for internal use. Please leave it open.

Note (3) LVDS data format Selection (0V~0.7V/OPEN:→JEDIA 2.7V~3.3V:→VESA)

Note (4) Interface optional pin has internal scheme as following diagram. Customer should keep the interface voltage level requirement which including Panel board loading as below.



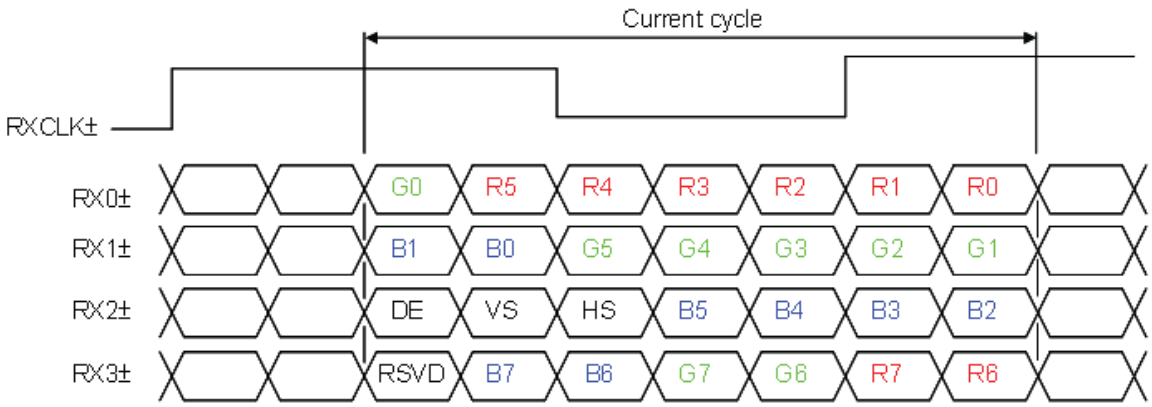
Note (5) LVDS connector mating dimension range request is 0.93mm~1.0mm as below.



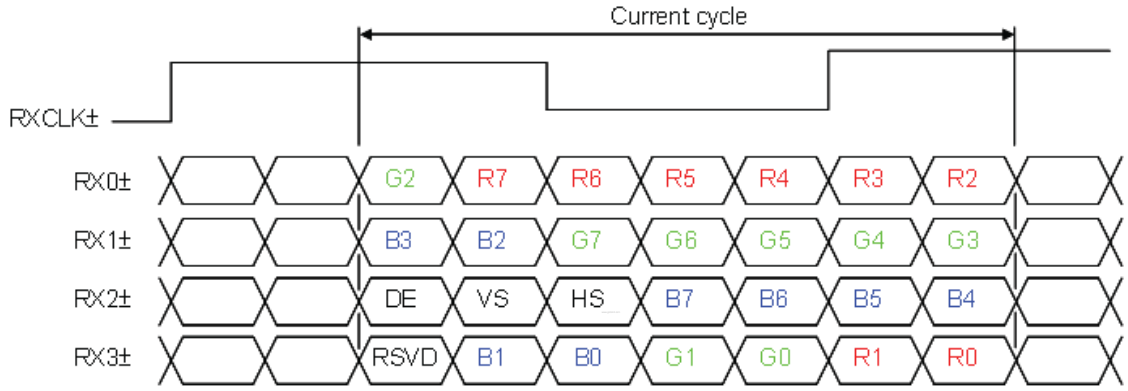
Note (6) The screw hole which is distant from the connector is merged with Ground.

5.2 LVDS INTERFACE

VESA LVDS format：(SELLVDS pin= H)



JEDIA LVDS format：(SELLVDS pin= L or Open)



R0~R7	Pixel R Data (7; MSB, 0; LSB)	DE	Data enable signal
G0~G7	Pixel G Data (7; MSB, 0; LSB)	DCLK	Data clock signal
B0~B7	Pixel B Data (7; MSB, 0; LSB)		

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

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 the 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
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	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	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
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	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	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. (Ta = 25 ± 2 ºC)

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	(2)
	Spread spectrum modulation range	F_{clkin_mod}	F_{clkin}-2%	—	F_{clkin}+2%	MHz	(3)
	Spread spectrum modulation frequency	F_{SSM}	—	—	200	KHz	
LVDS Receiver Data	Receiver Skew Margin	T_{RSKM}	-400	—	400	ps	-
Vertical Active Display Term	Frame Rate	F_{r5}	47	50	53	Hz	-
		F_{r6}	57	60	63	Hz	
	Total	Tv	776	806	1050	Th	Tv=Tvd+Tvb
	Display	Tvd	768	768	768	Th	-
	Blank	Tvb	8	38	282	Th	-
Horizontal Active Display Term	Total	Th	1530	1560	2006	Tc	Th=Thd+Thb
	Display	Thd	1366	1366	1366	Tc	-
	Blank	Thb	164	194	640	Tc	-

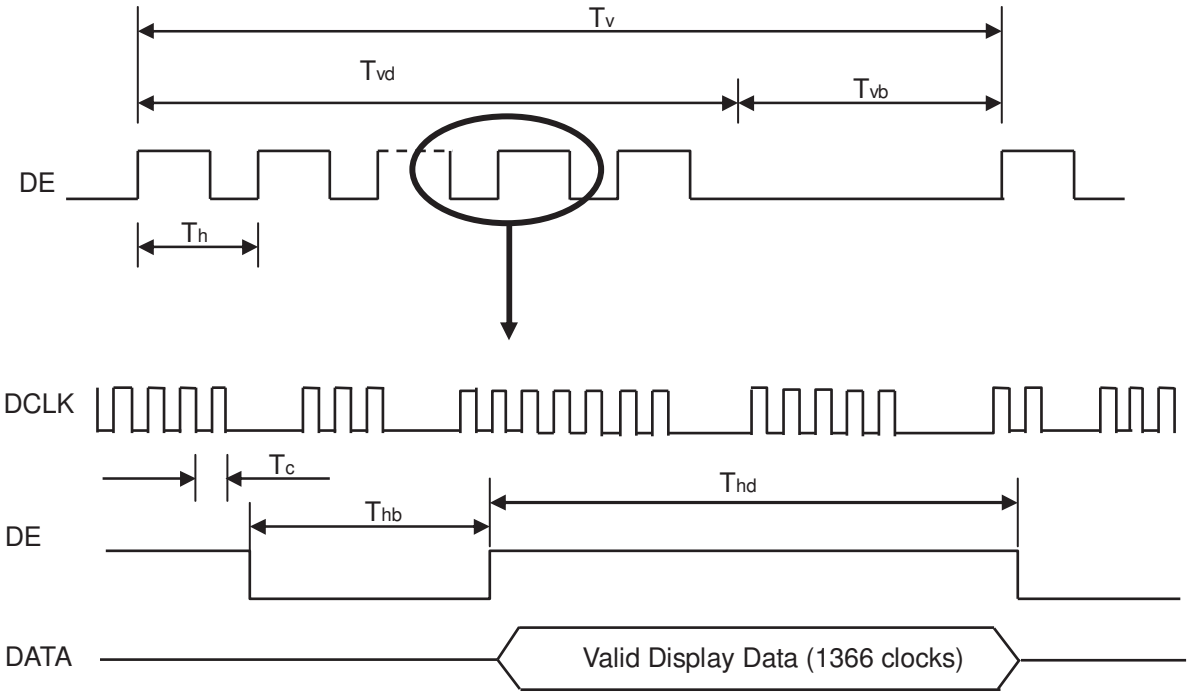
Note (1) Please make sure the range of frame rate has follow the below equation：

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

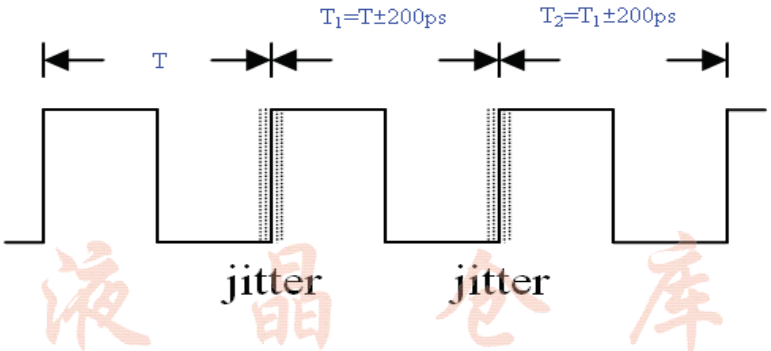
$Fr5 \times Tv \times Th \geqq Fclkin(min)$

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

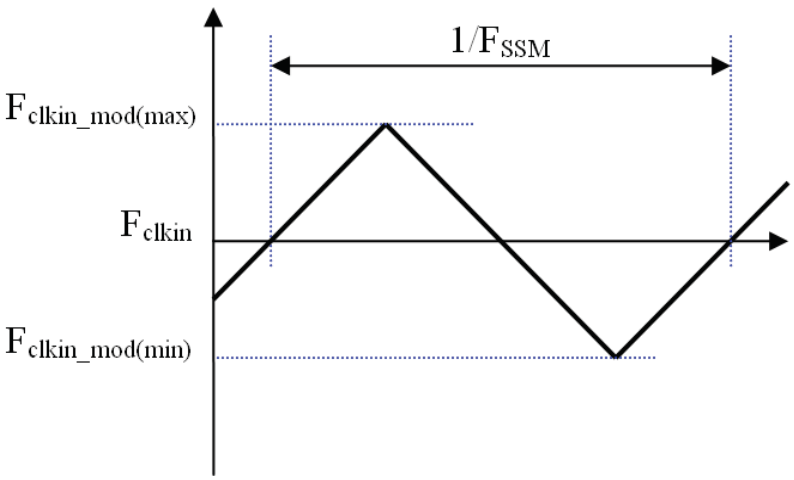
INPUT SIGNAL TIMING DIAGRAM



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

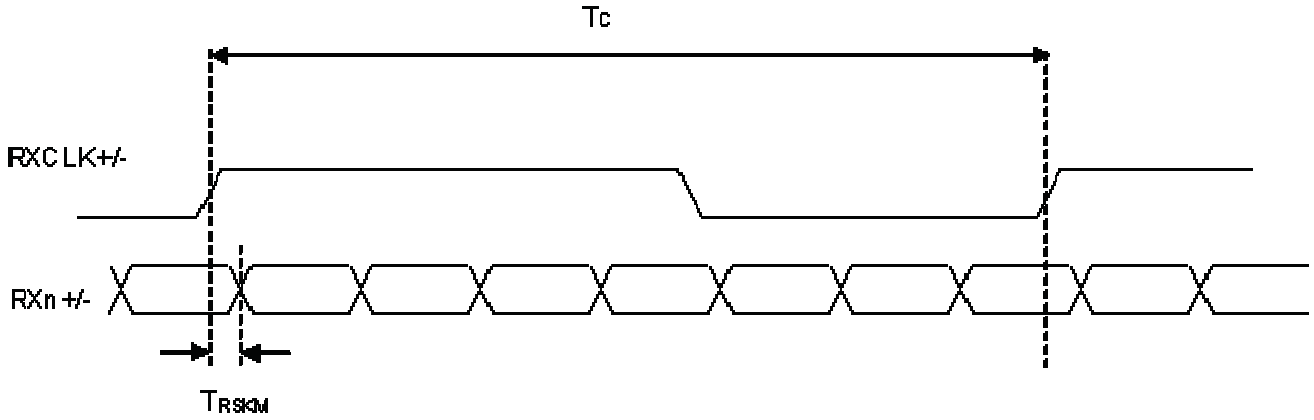


Note (4) The SSCG (Spread spectrum clock generator) is defined as below figures.



Note (5) LVDS receiver skew margin is defined and shown as below.

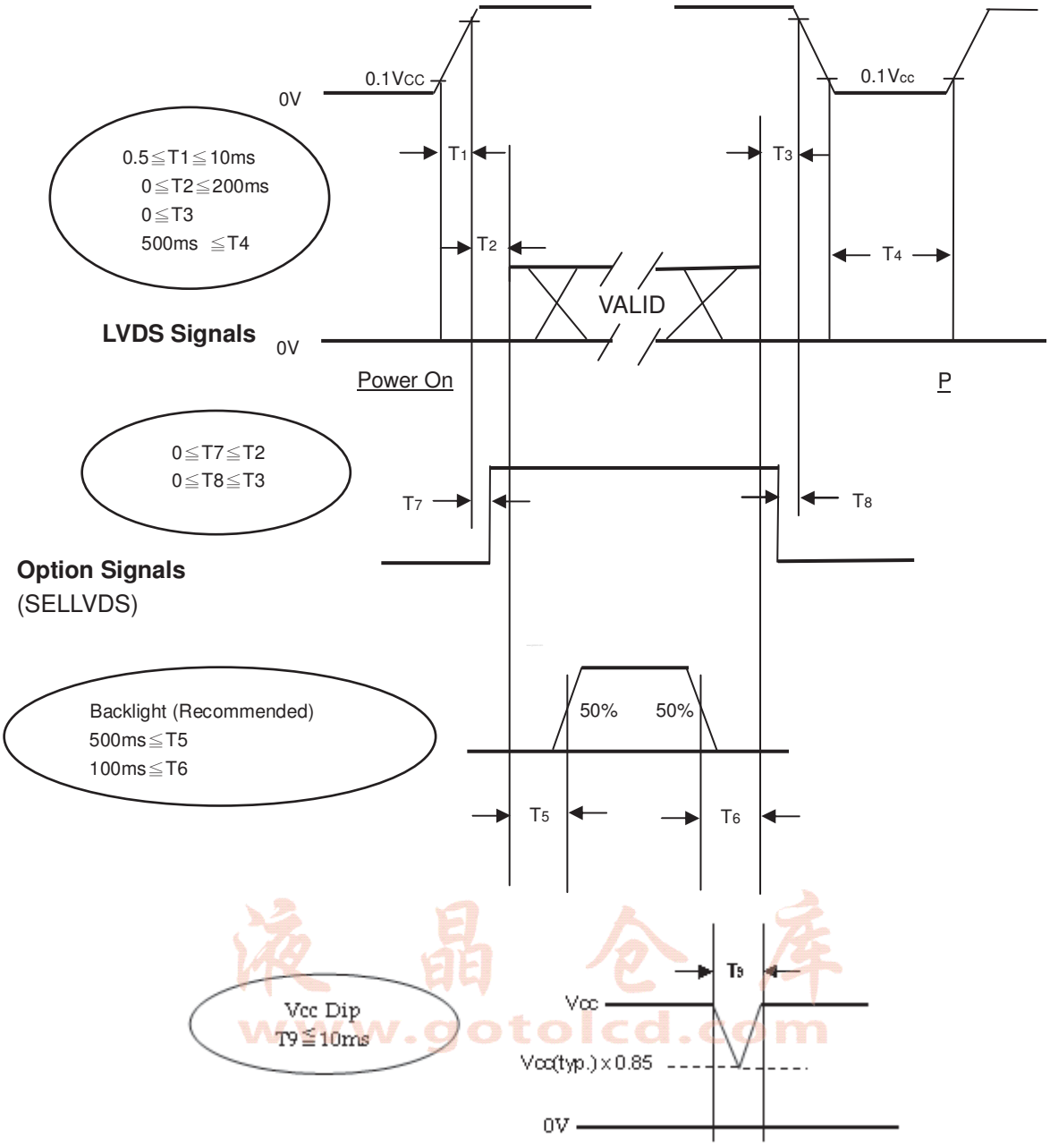
LVDS RECEIVER INTERFACE TIMING DIAGRAM



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

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.

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.

7. OPTICAL CHARACTERISTICS

7.1 TEST CONDITIONS

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	℃
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	VCC	12±1.2	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
LED Light Bar Input Current Per Input Pin	I_{PIN}	230	mA_{DC}
PWM Duty Ratio	D	100	%

Note : No guarantee level of water flow

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.

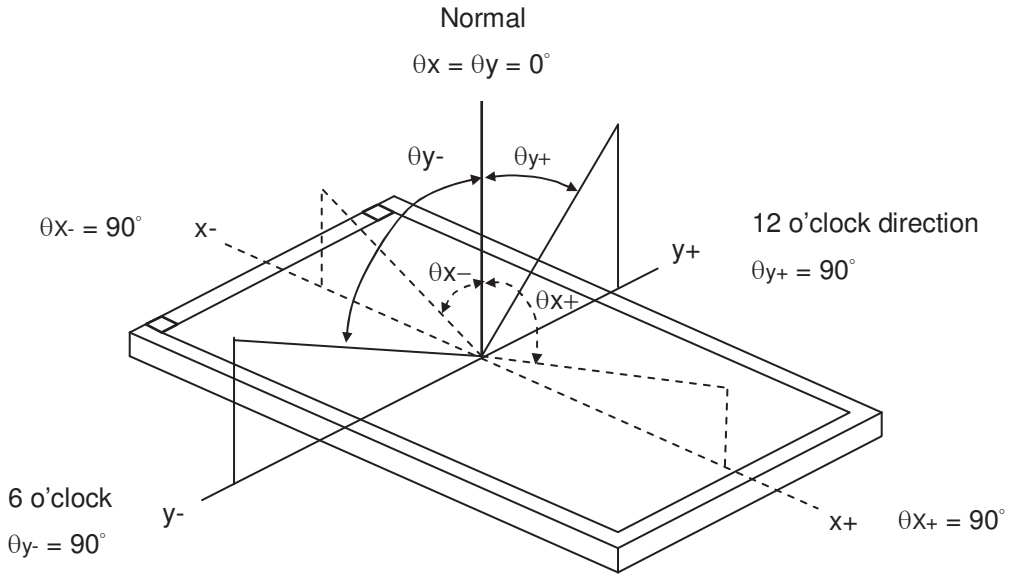
7.2 OPTICAL SPECIFICATIONS

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 7.1.

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	θx=0°, θy =0° Viewing angle at normal direction	2000	3000	—	-	(2)
Response Time		Gray to gray		—	8.5	20	ms	(3)
Center Luminance of White		L_C		200	250	—	cd/m^2	(5)
White Variation		δW		—	—	1.42		(7)
Cross Talk		CT		—	—	4.0	%	(6)
Color Chromaticity	Red	Rx		Typ. -0.03	0.643	Typ. +0.03	-	(1)(4)
		Ry			0.339		-	
	Green	Gx			0.316		-	
		Gy			0.613		-	
	Blue	Bx			0.152		-	
		By			0.054		-	
	White	Wx			0.285		-	
		Wy			0.293		-	
	Color Gamut	C.G		—	72	—	%	NTSC
Viewing Angle	Horizontal	θx+	CR≥10 With INX Module	80	89	—	Deg.	(1)(4)
		θx-		80	89	—		
	Vertical	θY+		80	89	—		
		θY-		80	89	—		

Note (1) Definition of Viewing Angle (θx, θy) :

Viewing angles are measured by Autronic Conoscope Cono-80



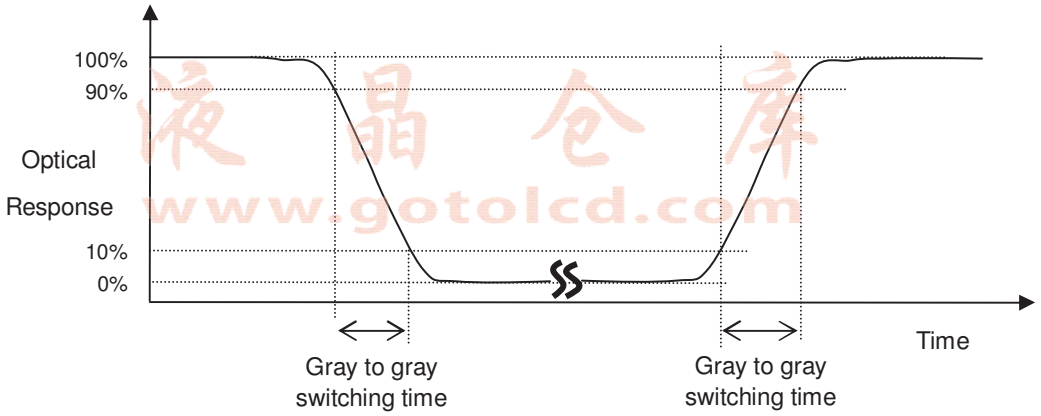
Note (2) Definition of Contrast Ratio (CR) :

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

CR = CR (5), where CR (X) is corresponding to the Contrast Ratio of the point X at the figure in Note(7).

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

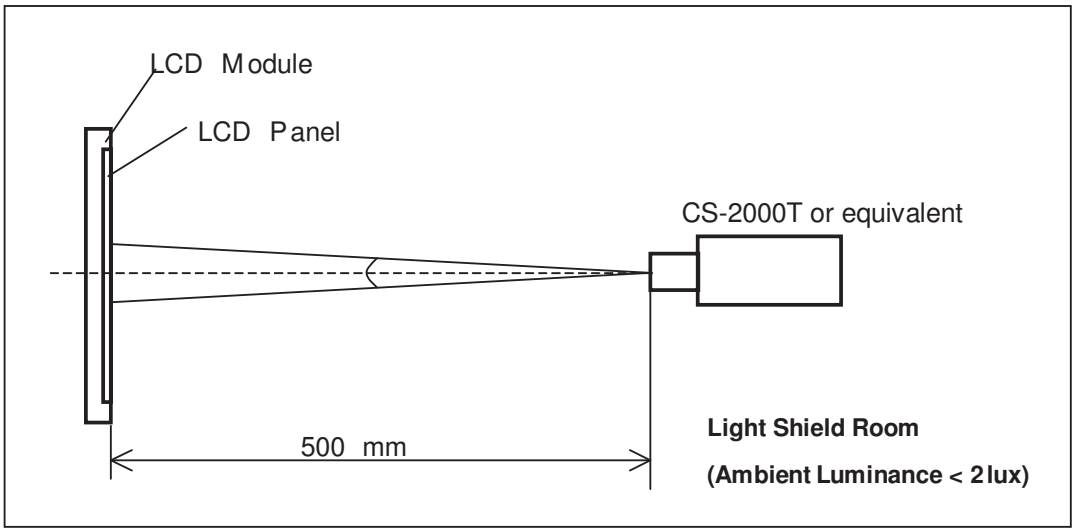


The driving signal means the signal of gray level 0, 31, 63, 95, 127, 159, 191, 223 and 255..

Gray to gray average time means the average switching time of gray level 0, 31, 63, 95, 127, 159, 191, 223 and 255 to each other.

Note (4) 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 (5) Definition of Luminance of White (L_C, L_{AVE}):

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

L_C = L (5), where L (X) is corresponding to the luminance of the point X at the figure in Note (7).

Note (6) Definition of Cross Talk (CT):

CT = | YB – YA | / YA × 100 (%)

Where:

YA = Luminance of measured location without gray level 0 pattern (cd/m^2)

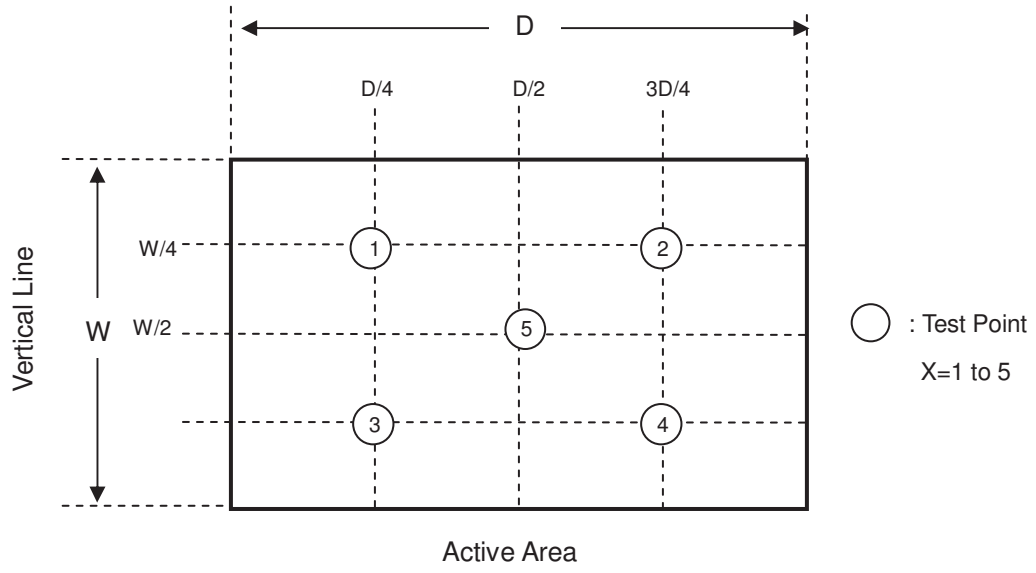
YB = Luminance of measured location with gray level 0 pattern (cd/m^2)

Note (7) 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



8. PRECAUTIONS

8.1 ASSEMBLY AND HANDLING PRECAUTIONS

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

[2] Do not apply pressure or impulse to the module to prevent the damage of LCD panel and Backlight.

[3] Bezel of Set can not press or touch the panel surface. It will make light leakage or scrape.

[4] It should be attached to the system firmly using all mounting holes.

[5] 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, do not press or scratch the surface harder than a HB pencil lead.

[6] Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

[7] Protection film for polarizer on the module should be slowly peeled off just before use so that the electrostatic charge can be minimized.

[8] Do not disassemble the module.

[9] 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.

[10] Do not plug in or pull out the I/F connector while the module is in operation, pins of I/F connector should not be touched directly with bare hands. Do not adjust the variable resistor located on the module.

[11] Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched. Water, IPA (Isoproyl Alcohol) or Hexane are desirable cleaners. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

[12] Moisture can easily penetrate into LCD module and may cause the damage during operation.

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

[13.1] 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℃ at normal humidity (under 70%) without condensation.

[13.2] The module shall be stored in dark place. Do not store the TFT-LCD module in direct sunlight or fluorescent light.

[14] When ambient temperature is lower than 10ºC, the display quality might be reduced. For example, the response time will become slow, and the starting voltage of LED will be higher than that of room temperature.

8.2 SAFETY PRECAUTIONS

To optimize PID module's lifetime and functions, operating conditions should be followed as below

[1] Normal operating condition

[1.1] Temperature : 20±15℃

[1.2] Humidity : 55±20%

[1.3] Well-ventilated place is suggested to set up PID module and system.

[1.4] Display pattern : regular switched patterns or moving pictures.

[1.4.1] Periodical power-off or screen saver is needed after long-term static display.

[1.4.2] Moving picture or black pattern is strongly recommended for screen saver.

[2] Operating requirements of PID modules and systems to prevent uneven display under long-term operating.

[2.1] PID suitable operating time : under 20 hrs a day.

[2.2] Periodical display contents should be changed from static image to moving picture.

[2.2.1] Different background and image colors changed respectively, and changed colors periodically.

[2.2.2] Background and image with large different luminance displayed at the same time should be avoided.

[3] The startup voltage of a Backlight may cause an electrical shock while assembling with the converter. Do not disassemble the module or insert anything into the Backlight unit.

[4] Do not connect or disconnect the module in the “Power On” condition.

[5] Do not exceed the absolute maximum rating value. (supply voltage variation, input voltage variation, variation in part contents and environmental temperature…) Otherwise the module may be damaged.

[6] 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.

[7] Module should be turned clockwise (regular front view perspective) when used in portrait mode.

[8] Ultra-violet ray filter is necessary for outdoor operation.

[9] Only when PID module is operated under right operating conditions, lifetime in this spec can be guaranteed. After the module’s end of life, it is not harmful in case of normal operation and storage

8.3 SAFETY STANDARDS

The LCD module should be certified with safety regulations as follows:

Regulatory	Item	Standard
Information Technology equipment	UL	UL60950-1:2006 or Ed.2:2007
	cUL	CAN/CSA C22.2 No.60950-1-03 or 60950-1-07
	CB	IEC60950-1:2005 / EN60950-1:2006+ A11:2009
Audio/Video Apparatus	UL	UL60065 Ed.7:2007
	cUL	CAN/CSA C22.2 No.60065-03:2006 + A1:2006
	CB	IEC60065:2001+ A1:2005 / EN60065:2002 + A1:2006+ A11:2008

9. DEFINITION OF LABELS

9.1 MODULE LABEL

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

(a) Model Name: V236BJ1-LE2

(b) Revision: Rev. XX, for example: A0, A1… B1, B2… or C1, C2…etc.

(c) INX barcode definition:

Serial ID: XX-XX-X-XX-YMD-L-NNNN

Code	Meaning	Description
XX	INX internal use	-
XX	Revision	Cover all the change
X	INX internal use	-
XX	INX internal use	-
YMD	Year, month, day	Year:0~9, 2001=1, 2002=2, 2003=3…2010=0,2011=1,2012=2… Month: 1~12=1, 2, 3, ~, 9, A, B, C Day: 1~31=1, 2, 3, ~, 9, A, B, C, ~, W, X, Y, exclude I, O, and U.
L	Product line #	Line 1=1, Line 2=2, Line 3=3, …
NNNN	Serial number	Manufacturing sequence of product

(d) Customer's barcode definition:

Serial ID: CM-N61E2-X-X-X-XX-L-XX-L-YMD-NNNN

Code	Meaning	Description
CM	Supplier code	CMI=CM
N61E2	Model number	V236BJ1-LE2 = N61E2
X	Revision code	Non ZBD: 1,2,~,8,9 / ZBD: A~Z
X	Source driver IC code	Century=1, CLL=2, Demos=3, Epson=4, Fujitsu=5, Himax=6, Hitachi=7, Hynix=8, LDI=9, Matsushita=A, NEC=B, Novatec=C, OKI=D, Philips=E, Renasas=F, Samsung=G, Sanyo=H, Sharp=I, TI=J, Topro=K, Toshiba=L,Windbond=M
X	Gate driver IC code	
XX	Cell location	Tainan Taiwan=TN, Ningbo China=NP, Hsinchu Taiwan=SC
L	Cell line #	1,2,~,9,A,B,~,Y,Z
XX	Module location	Tainan Taiwan=TN, Ningbo China=NP
L	Module line #	1,2,~,9,A,B,~,Y,Z
YMD	Year, month, day	Year:0~9,2001=1,2002=2, 2003=3…2010=0, 2011=1, 2012=2… Month: 1~12=1, 2, 3, ~, 9, A, B, C Day: 1~31=1, 2, 3, ~, 9, A, B, C, ~, T, U, V
NNNN	Serial number	By LCD supplier

9.2 CARTON LABEL

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

P.O. NO._____

Parts ID._____

Model Name V236BJ1-LE2

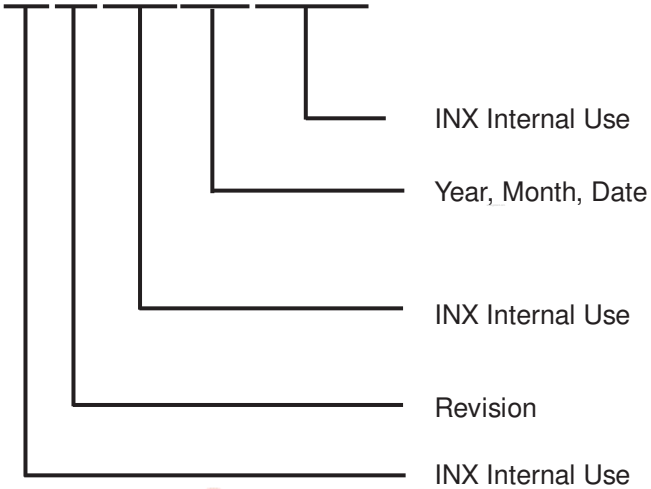
Carton ID._____ Quantities ___

XXXXXXXXXXXXX

Made In Taiwan (Made In China)

Model Name: V236BJ1– LE2

Carton ID: X X X X X X X Y M D X X X X



Serial ID includes the information as below :

Manufactured Date:

Year: 2010=0, 2011=1, 2012=2…etc.

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

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

Revision Code: Cover all the change

10. PACKAGING

10.1 PACKING SPECIFICATIONS

(1) 11 LCD modules / 1 Box

(2) Box dimensions: 620(L) X 348(W) X 430(H) mm

(3) Weight: approximately: 30.5kg (11 modules per box)

10.2 PACKAGING METHOD

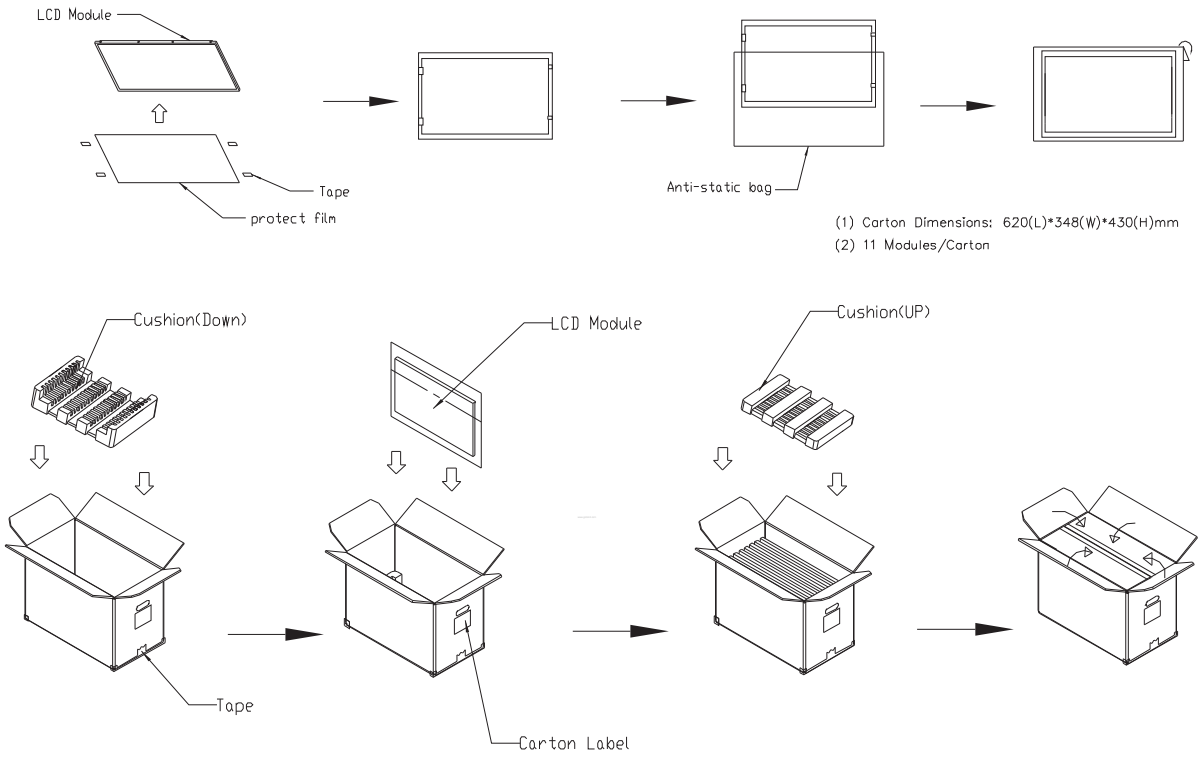
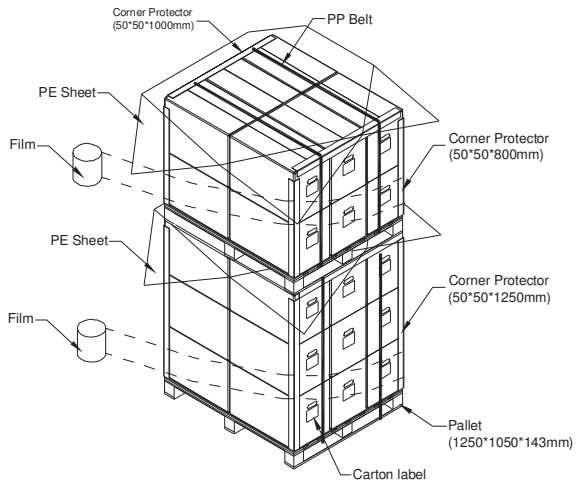


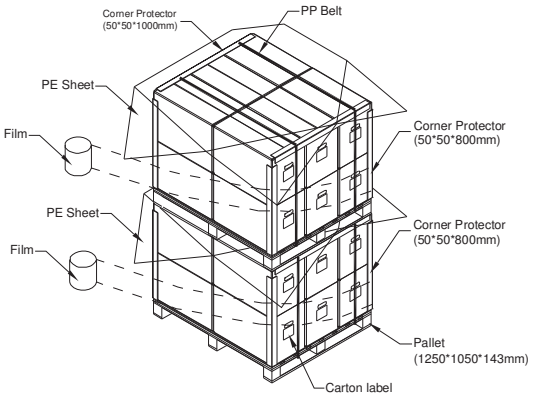
Figure 10-1 packing method

For ocean shipping

Sea / Land Transportation (40ft HQ Container)



Sea / Land Transportation (40ft/20ft Container)



For air

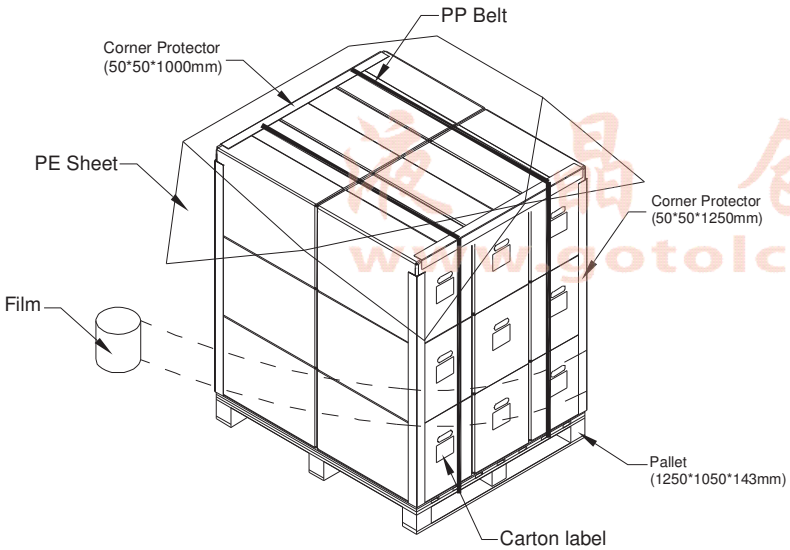


Figure 10-2 packing method

10.3 UN-PACKAGING METHOD

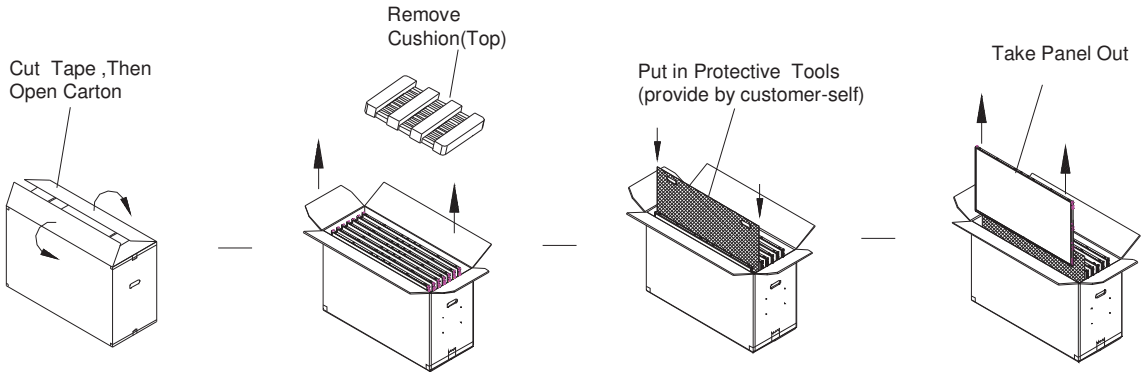


Figure 10-3 UN-packing method

11. MECHANICAL CHARACTERISTIC