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TECHNICAL SPECIFICATION
MODEL NO.: V26L8060BA

Customer's Confirmation

Customer Name _____

Date _____

By _____

PVI's Confirmation

Confirmed By _____

Prepared By _____

PRIME VIEW INTERNATIONAL CO.,LTD.
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<http://www.pvi.com.tw>

Date: Jun. 29, 2001

This technical specification is subject to change without notice.
Please contact with PVI for more detail information about this specification sheet.

TECHNICAL SPECIFICATION**CONTENTS**

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1.Application

This data sheet applies to a color TFT LCD module, V26L8060BA.

V26L8060BA module applies to notebook PC, sub-note-book PC and other OA product, which require high quality flat panel display. **This module is not designed for aerospace, avionics, medical, F/A, transportation, car or any other products, which require extreme level of reliability.**

Prime View assume no responsibility for any damage resulting from the use of the device which dose not comply with the instructions and the precautions in these specification sheet.

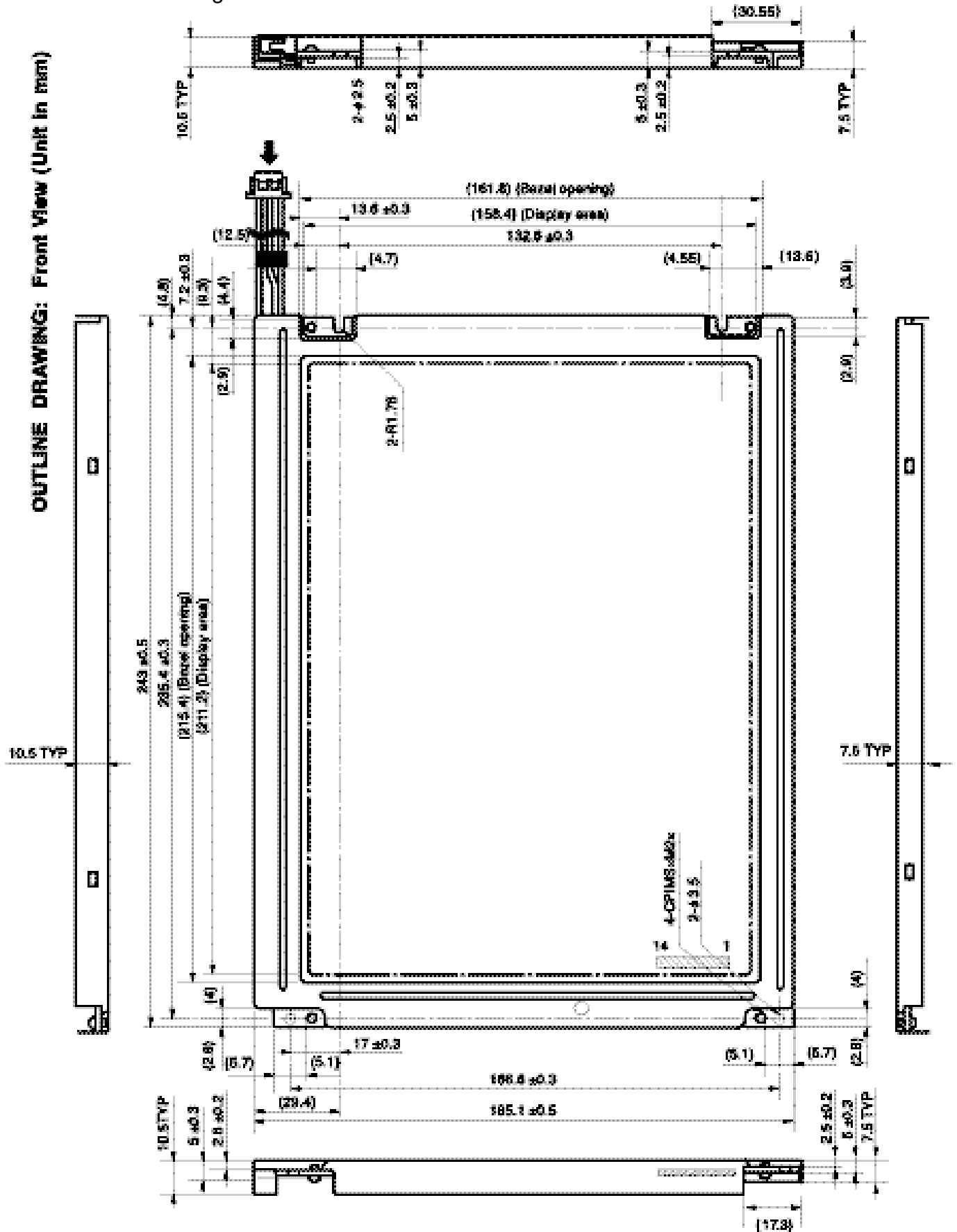
2. Features

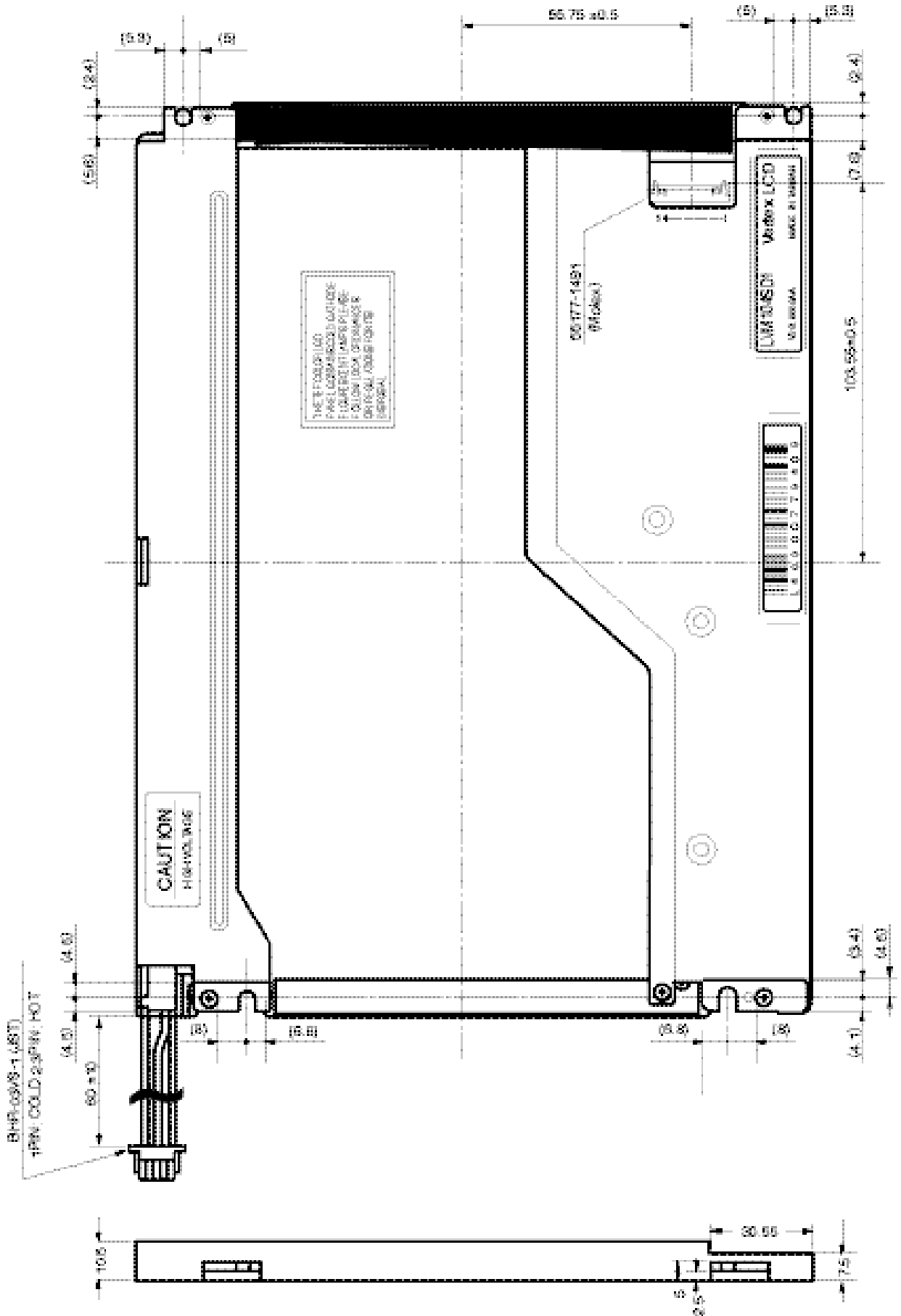
- . Amorphous silicon TFT LCD panel with back-light unit
- . Pixel in stripe configuration
- . Slim and compact, designed for O/A application
- . Display Colors : 262,144 colors
- . Optimum Viewing Direction : 6 o'clock
- . 3.3V LVDS interface standard: DS90CF364 as receiver
- . +3.3V DC supply voltage for TFT LCD panel driving
- . Backlight driving DC/AC inverter not included in this module

3.Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	26.4(diagonal)	cm
	10.4 (diagonal)	inch
Display Format	800× (R, G, B)× 600	dot
Display Colors	262,144	
Active Area	211.2(H)× 158.4 (V)	mm
Pixel Pitch	0.264 (H)× 0.264 (V)	mm
Pixel Configuration	Stripe	
Outline Dimension	243 (w)× 185.1(H)× 11(typ.) (D)	mm
Weight	470(typ.),	g
Back-light	CCFL, 2 tubes	
Surface treatment	Anti-glare and hard-coating	
Display mode	Normally white	

4. Mechanical Drawing of TFT-LCD Module





5. Input Terminals

5-1) TFT-LCD Panel Driving

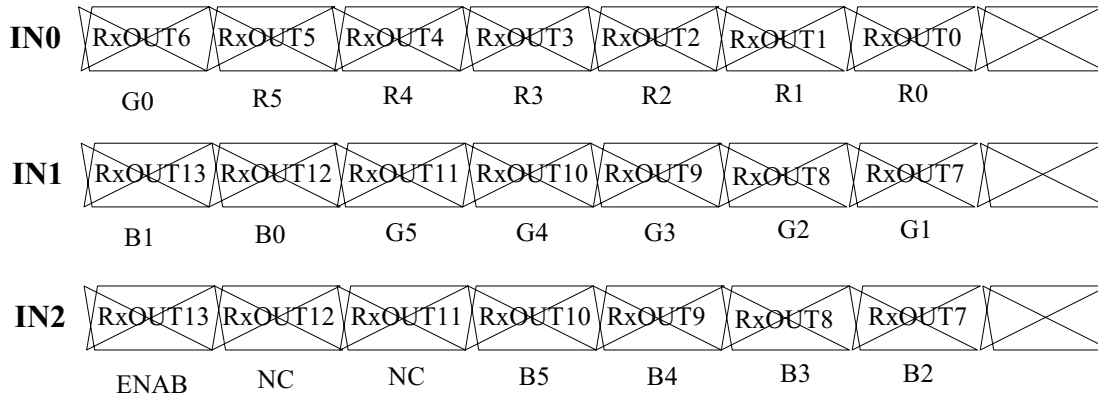
Connector type: Molex 55177-1491

Pin No.	Symbol	Function	Remark
1	VDD	Power supply : +3.3V	
2	VDD	Power supply : +3.3V	
3	GND		
4	GND		
5	IN0-	Pixel data Transmission pair 0 (negative -)	
6	IN0+	Pixel data Transmission pair 0 (positive +)	
7	IN1-	Pixel data Transmission pair 1 (negative -)	
8	IN1+	Pixel data Transmission pair 1 (positive +)	
9	IN2-	Pixel data Transmission pair 2 (negative -)	
10	IN2+	Pixel data Transmission pair 2 (positive +)	
11	CLK-	Sampling Clock (negative -)	
12	CLK+	Sampling Clock (positive +)	
13	GND		
14	GND		

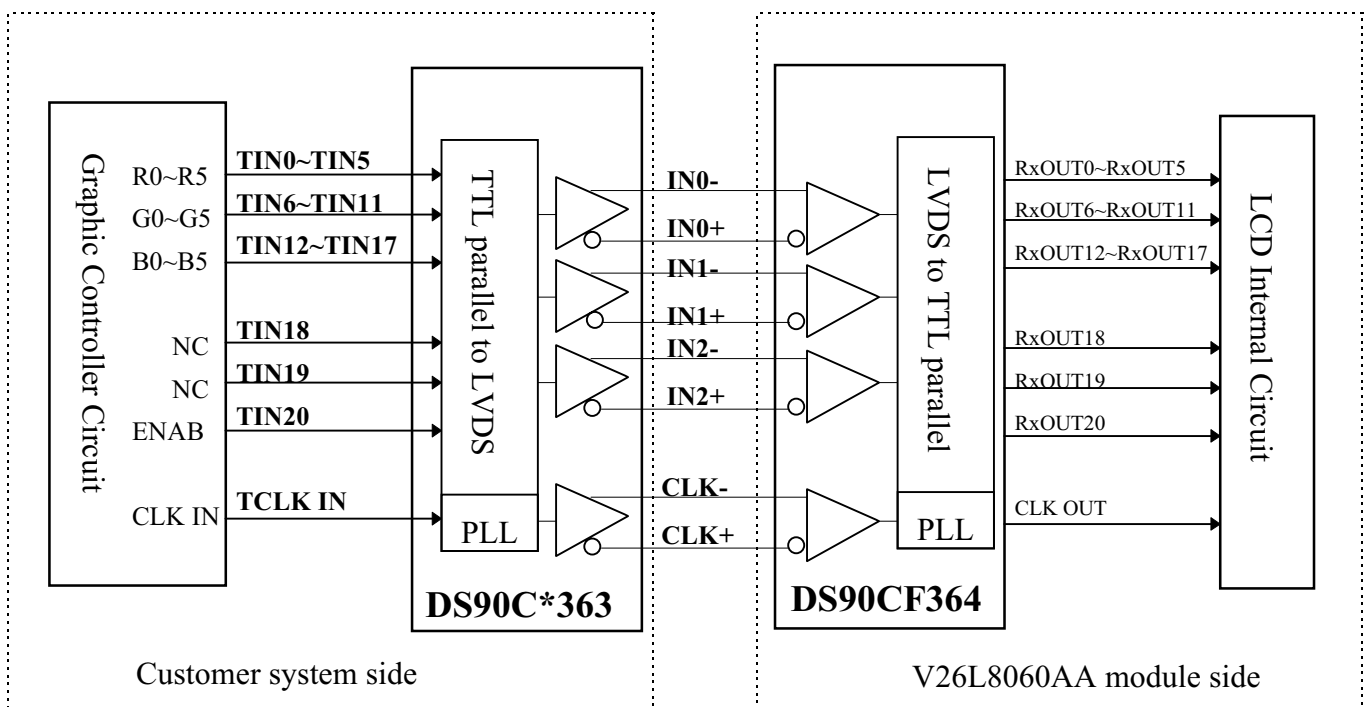
Recommended Transmitter (DS90C*363 of National Semiconductor) to V26L8060BA interface Assignment:

Input terminal of DS 90C*363		Graphic controller output signal		Output signal symbol	To V26L8060AA interface terminal(Symbol)
Symbol	No.	Symbol	Function		
TIN0	44	R0	Red pixel data (LSB)	Tout0- Tout0+	No.5 : IN0- No.6 : IN0+
TIN1	45	R1	Red pixel data		
TIN2	47	R2	Red pixel data		
TIN3	48	R3	Red pixel data		
TIN4	1	R4	Red pixel data		
TIN5	3	R5	Red pixel data(MSB)	Tout1- Tout1+	No.7 : IN1- No.8 : IN1+
TIN6	4	G0	Green pixel data (LSB)		
TIN7	6	G1	Green pixel data		
TIN8	7	G2	Green pixel data		
TIN9	9	G3	Green pixel data		
TIN10	10	G4	Green pixel data	Tout2- Tout2+	No.9 : IN2- No.10 : IN2+
TIN11	12	G5	Green pixel data(MSB)		
TIN12	13	B0	Blue pixel data(LSB)		
TIN13	15	B1	Blue pixel data		
TIN14	16	B2	Blue pixel data		
TIN15	18	B3	Blue pixel data	TCLK out- TCLK out+	No.11 : CLK IN- No.12 : CLK IN+
TIN16	19	B4	Blue pixel data		
TIN17	20	B5	Blue pixel data(MSB)		
TIN18	22	NC	No connection		
TIN19	23	NC	No connection		
TIN20	25	ENAB	Compound Synchronization signal		
CLK in	26	NCLK	Data sampling clock		

Data stream of IN0-/+, IN1-/+, and IN2-/+, for V26L8060BA



LVDS Interface Block Diagram



5-2) Back light driving

The part number is BHR-03VS-1, manufactured by JST .The mating connector part number is SM02(8.0)B-BHS-1-TB or equivalent.

PIN NO.	Symbol	Description	Remark
1	LV	Ground	White
2	HV	Lamp power input	Pink (or Gray)
3	HV	Lamp power input	Pink (or Gray)

6.Absolute Maximum Ratings:

GND=0V, Ta=25°C

Parameters	Symbol	MIN.	MAX.	Unit	Remark
Supply Voltage	VDD	-0.3	+4.0	V	
Input Signals Voltage	V _{IN}	-0.3	VDD+0.3	V	Note 6-1
Backlight Driving Voltage	V _L	-	2000	V	
Backlight Driving Frequency	F _L	0	100	KHz	
Storage Temperature	T _{ST}	-20	+60	°C	Note 6-2
Operating Temperature	T _{OP}	0	+50	°C	

Note 6-1: LVDS signal

Note 6-2: Humidity : 90% RH Max. at Ta ≤ 40°C.

Maximum wet-bulb temperature is at 39°C or less at Ta > 40°C and no condensation.

7.Electrical Characteristics

7-1) Recommended Operating Conditions:

GND = 0V · Ta = 25°C

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage	VDD	3.0	3.3	3.6	V	
Current Dissipation	I _{DD}	-	370	430	mA	Note 7-1
LVDS Differential input high threshold	V _{TH}	-	-	100	mV	Note 7-2
LVDS Differential input low threshold	V _{TL}	-100	-	-		
Lamp Current	I _{FL}	3.0	7.0	8.0	mA	Note 7-3
Lamp Voltage	V _L	540	580	665	V _{rms}	Note 7-3
Lamp Initial Voltage	V _{SFL}	-	-	875	V _{rms}	at Ta=25°C Note 7-4
		-	-	1300		at Ta=0°C Note 7-4
Lamp Driving Frequency	F _L	30	55	60	KHz	
Lamp power consumption		4	8	11	W	Note 7-5
Lamp Life Time		30000	40000		Hrs	Note 7-6
LCD Panel Life Time(MTBF)			50000		Hrs	

Note 7-1 : To test the current dissipation of VDD, using the “color bars” testing pattern shown as below

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

1. White
2. Yellow
3. Cyan
4. Green
5. Magenta
6. Red
7. Blue
8. Black

Idd current dissipation testing pattern

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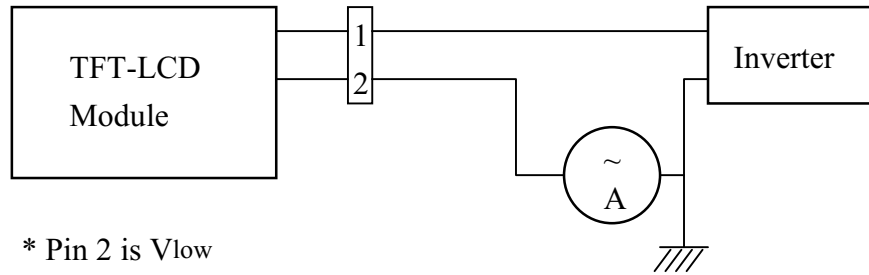
Note 7-2 : Please refers to DS90CF364 specification by National Semiconductor Corporation. This LCD module conforms to LVDS standard.

Note 7-3 : The variance of the voltage is $\pm 10\%$.

Note 7-4 : The output voltage at the transformer in the inverter must be high considering to the loss of the ballast capacitor in the inverter.

Note 7-5: The lamp power consumption on shown above does not include loss of external inverter.

Note 7-6: The life time is determined as the time at which brightness of lamp is 50% compare to that of initial value at the typical lamp current.

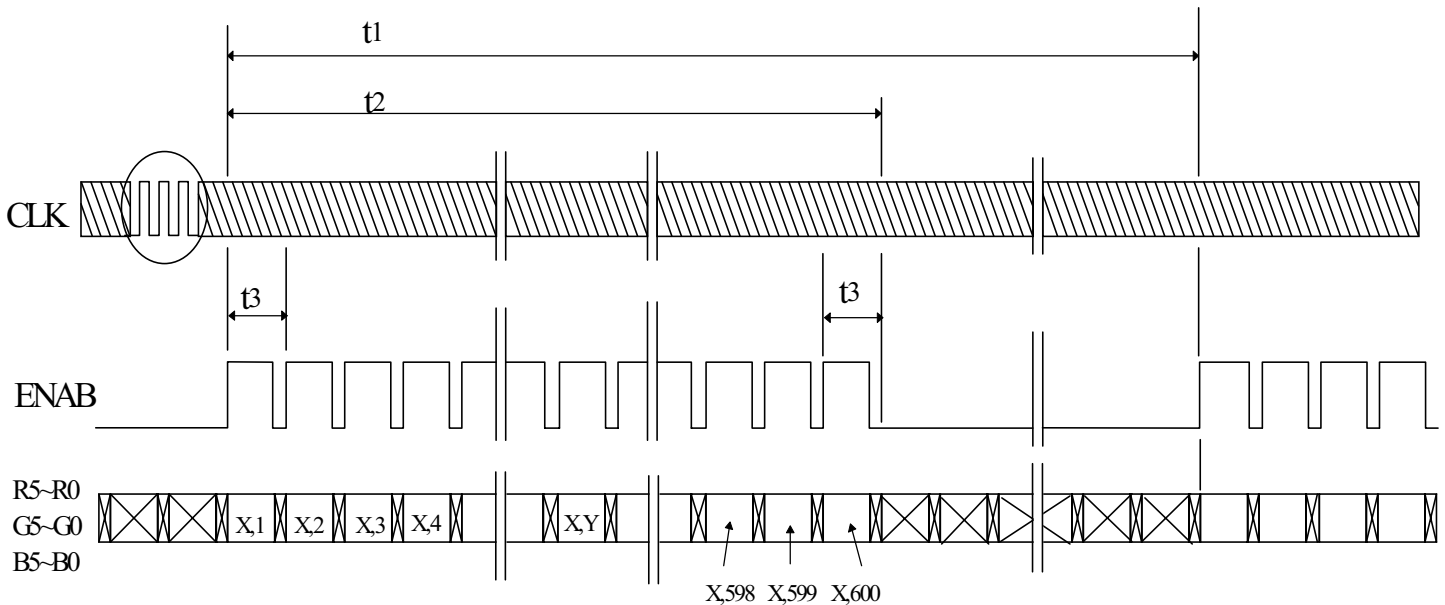


* Pin 2 is V_{low}
 ** Current meter :
 Yokogawa 2016-01

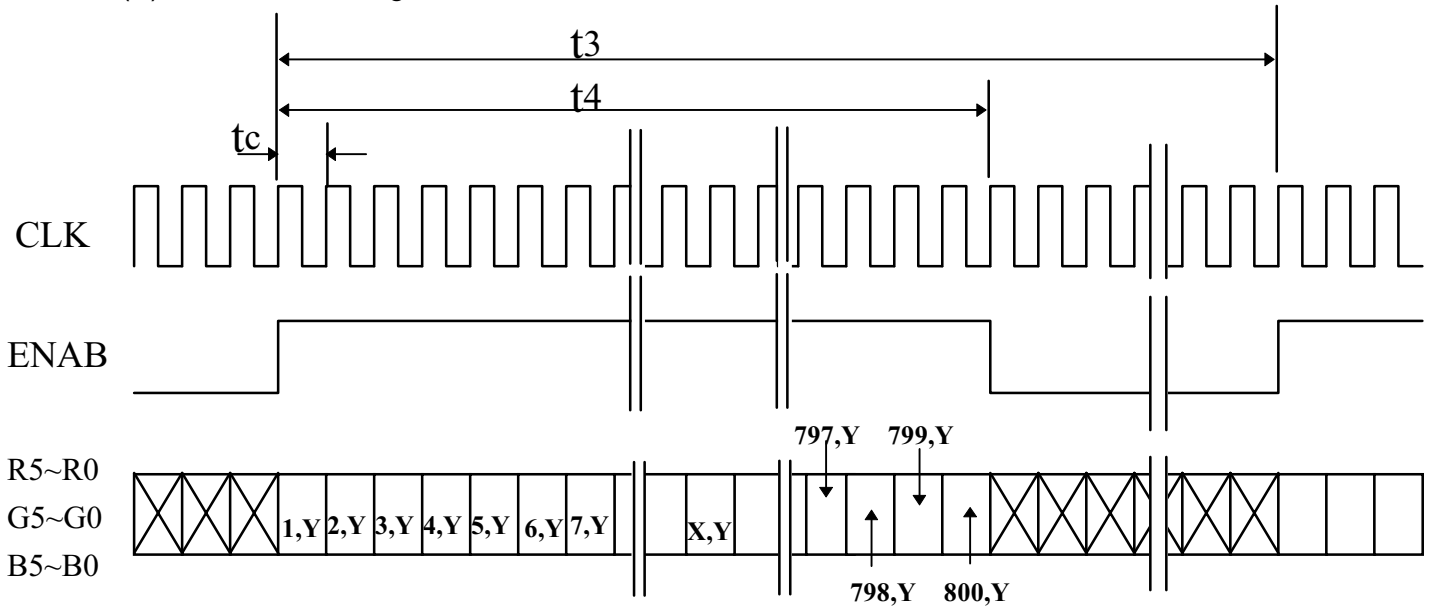
Lamp current dissipation testing configuration

7-2) Input / Output signal timing chart

(A) Vertical Timing



(B) Horizontal Timing



D) Timing Specifications

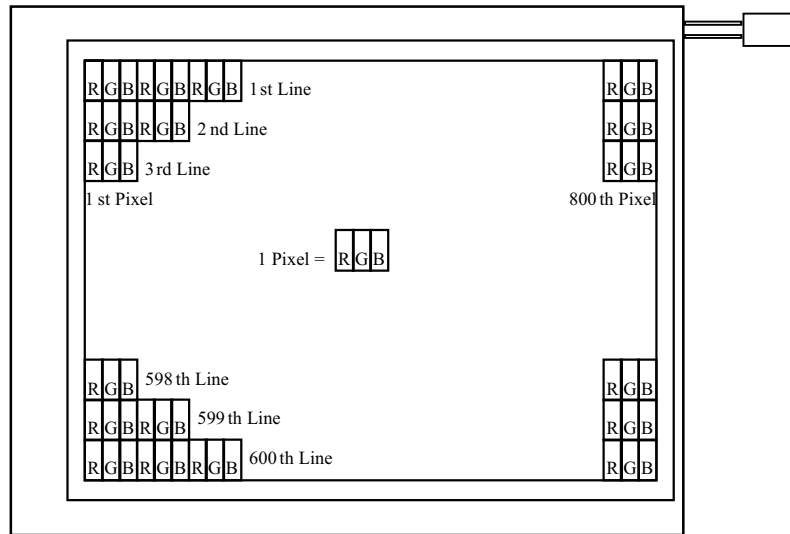
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Frame Cycling	t1	604 X t3	628X t3	677 X t3	-	
		-	16.58	17.86	ms	
Vertical Display Period	t2	600 X t3	600 X t3	600 X t3	-	
Horizontal Scanning Time	t3	844 X t5	1056 X t5	1064 X t5	-	
		26.3	26.4	-	□s	
Horizontal Display Period	t4	-	800 X t5	-	-	
Clock Cycle	t5	24.0	25.0	-	ns	
Clock High Level Time	t6	9.0	-	-	ns	
Clock Low Level Time	t7	9.0	-	-	ns	
Hold time	t8	4.0	-	-	ns	
Set-up time	t9	5.0	-	-	ns	

7-3) Display Color and Gray Scale Reference

Color		Input Color Data																	
		Red						Green						Blue					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green (63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue (63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Red	Red (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (01)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red (02)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker																		
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Brighter																		
	Red (61)	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red (62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Red (63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
Green	Green (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green (01)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green (02)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker																		
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Brighter																		
	Green (61)	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0
	Green (62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
Green (63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	
Blue	Blue (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue (01)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue (02)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Darker																		
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Brighter																		
	Blue (61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	Blue (62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
Blue (63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	

7-4) Pixel Arrangement

The LCD module pixel arrangement is the stripe.



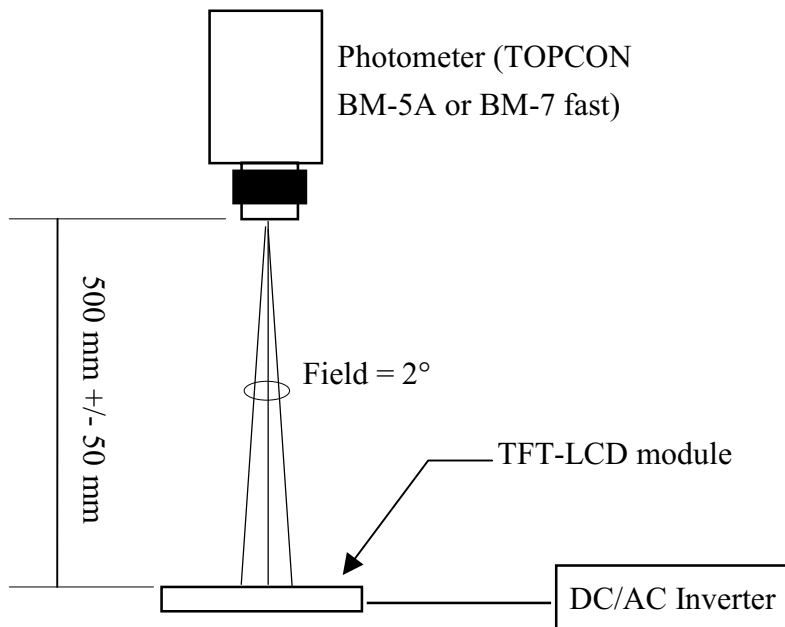
8. Optical Characteristics

8-1) Specification:

Ta = 25°C

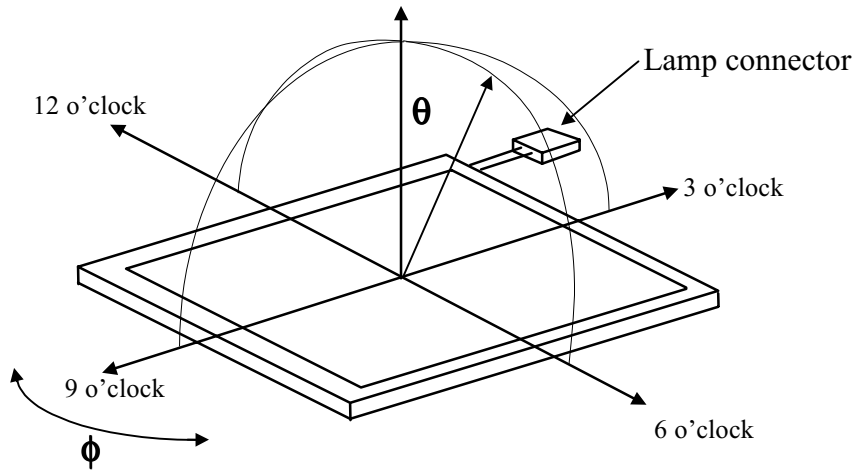
Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks	
Viewing Angle	Horizontal	CR≥10	± 35	± 45	-	deg	Note 8-1	
	Vertical		θ (to 12 o'clock)	10	15	-		deg
			θ (to 6 o'clock)	25	40	-		deg
Contrast Ratio	CR	Optimum direction	100	180	-	-	Note 8-2	
Response time	Rise	Tr	-	15	50	ms	Note 8-4	
	Fall	Tf	-	25	50	ms		
Luminance	L	θ=0°/□=0°	500	550	-	cd/m ²	Note 8-3	
Luminance Uniformity	U		55	80	-	%	Note 8-5	
White Chromaticity	x		0.280	0.330	0.380	-		
	y		0.290	0.340	0.390	-		
Cross Talk Ratio	CTK		-	-	3.5	%	Note 8-6	

All the optical measurement shall be executed 30 minutes after backlight being turn-on. The optical characteristics shall be measured in dark room (ambient illumination on panel surface less than 1 Lux). The measuring configuration shows as following figure.



Optical characteristics measuring configuration

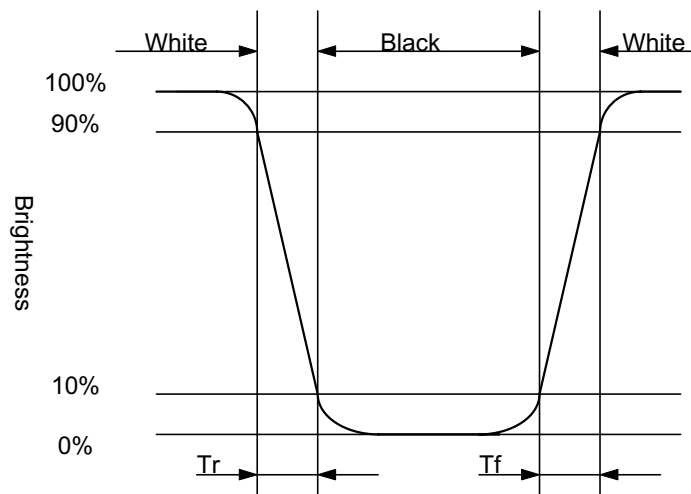
Note 8-1` : The definitions of viewing angles are as follows.



Note 8-2 : The definition of contrast ratio $CR = \frac{\text{Luminance at gray level 63}}{\text{Luminance at gray level 0}}$

Note 8-3 : Topcon BM-5A luminance meter 2° field of view is used in the testing (after 30 minutes' operation).

Note 8-4: Definition of Response Time T_r and T_f :



Note 8-5: The uniformity of LCD is defined as

$$U = \frac{\text{The Minimum Brightness of the 9 testing Points}}{\text{The Maximum Brightness of the 9 testing Points}}$$

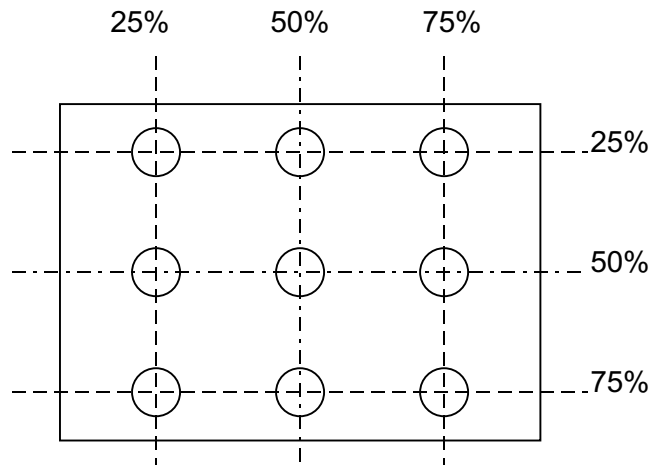
Luminance meter : BM-5A or BM-7 fast(TOPCON)

Measurement distance : 500 mm +/- 50 mm

Ambient illumination : < 1 Lux

Measuring direction : Perpendicular to the surface of module

The test pattern is white (Gray Level 63).



Note 8-6: Cross Talk (CTK) = $\frac{|YA-YB|}{YA} \times 100\%$

YA: Brightness of Pattern A

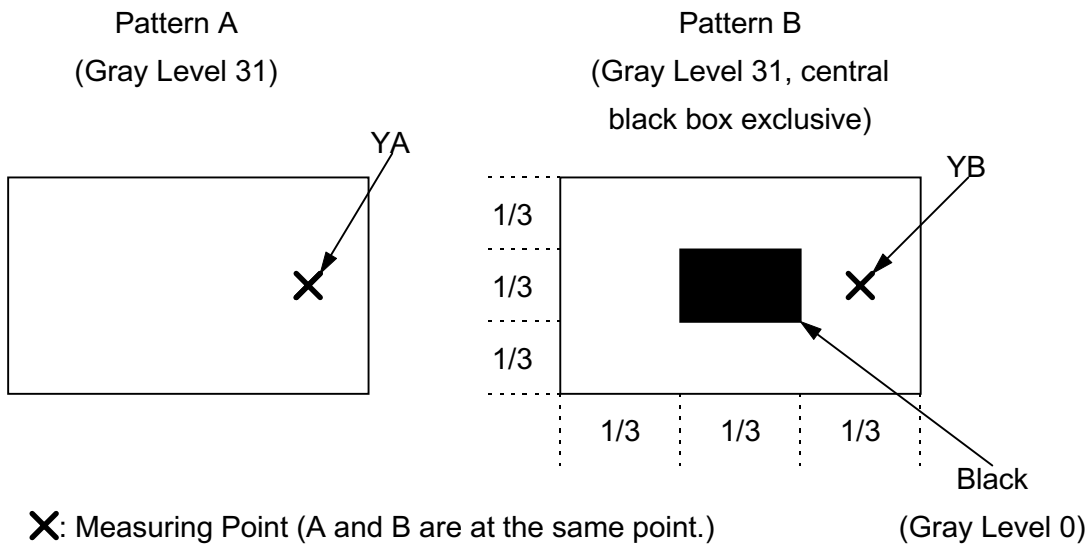
YB: Brightness of Pattern B

Luminance meter : BM 5A (TOPCON)

Measurement distance : 500 mm +/- 50 mm

Ambient illumination : < 1 Lux

Measuring direction : Perpendicular to the surface of module



9. Reliability Test

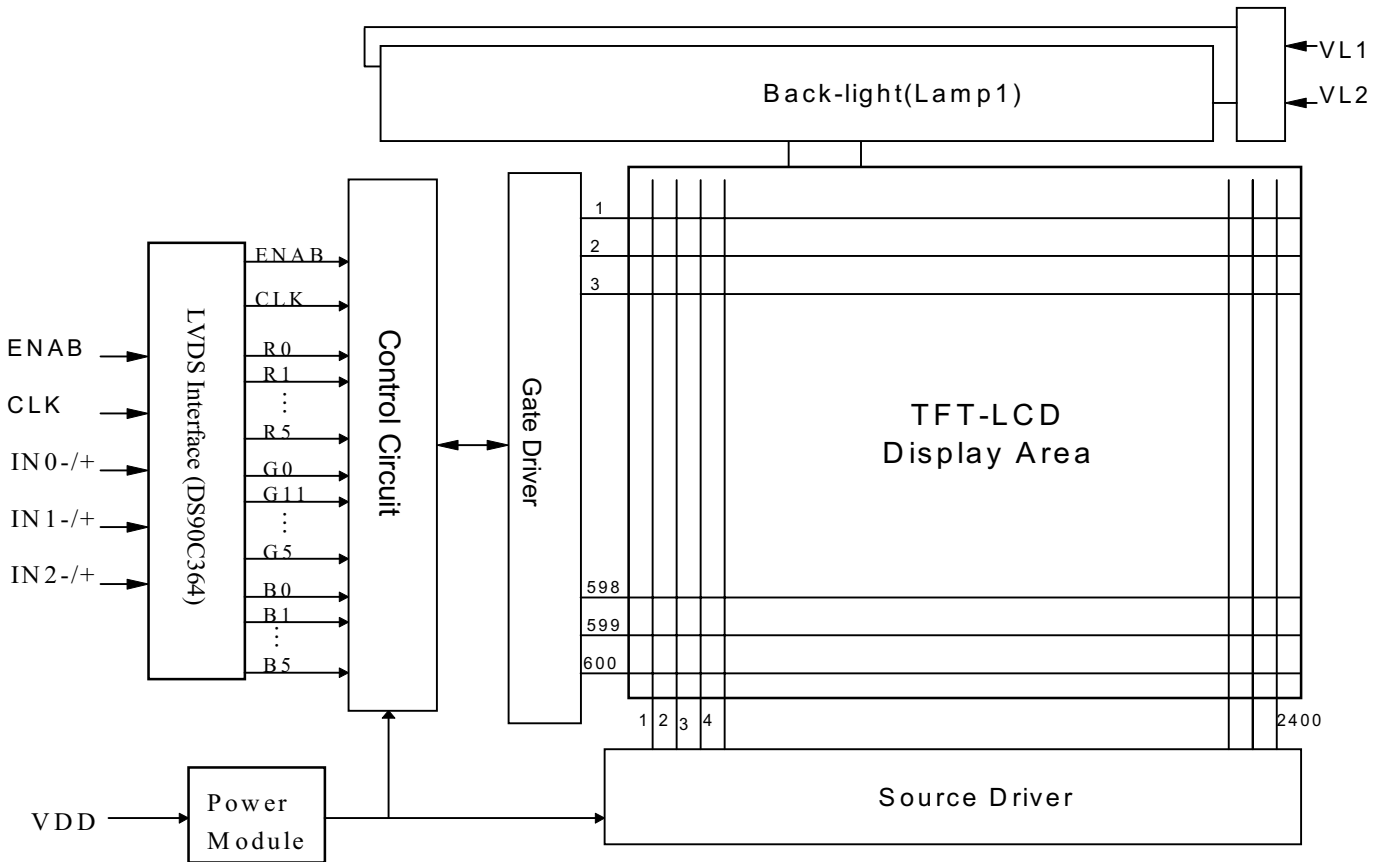
No	Test Item	Test Condition	Remark
1	High Temperature Storage Test	Ta = +60°C, 240 hrs	
2	Low Temperature Storage Test	Ta = -20°C, 240 hrs	
3	Low Temperature Operation Test	Ta = 0°C, 240 hrs	
4	High Temperature & High Humidity Operation Test	Ta = +50°C, 50%RH, 240 hrs (No Condensation)	
5	Vibration Test (non-operating)	Frequency : 10 ~ 57 Hz, Amplitude : 0.15 mm 58~500Hz, 1G Sweep time: 11 min Test Period: 3 hrs (1 hr for each direction of X, Y, Z)	
6	Shock Test (non-operating)	80G, 6ms, X,Y, Z 1 times for each direction	

Ta: ambient temperature

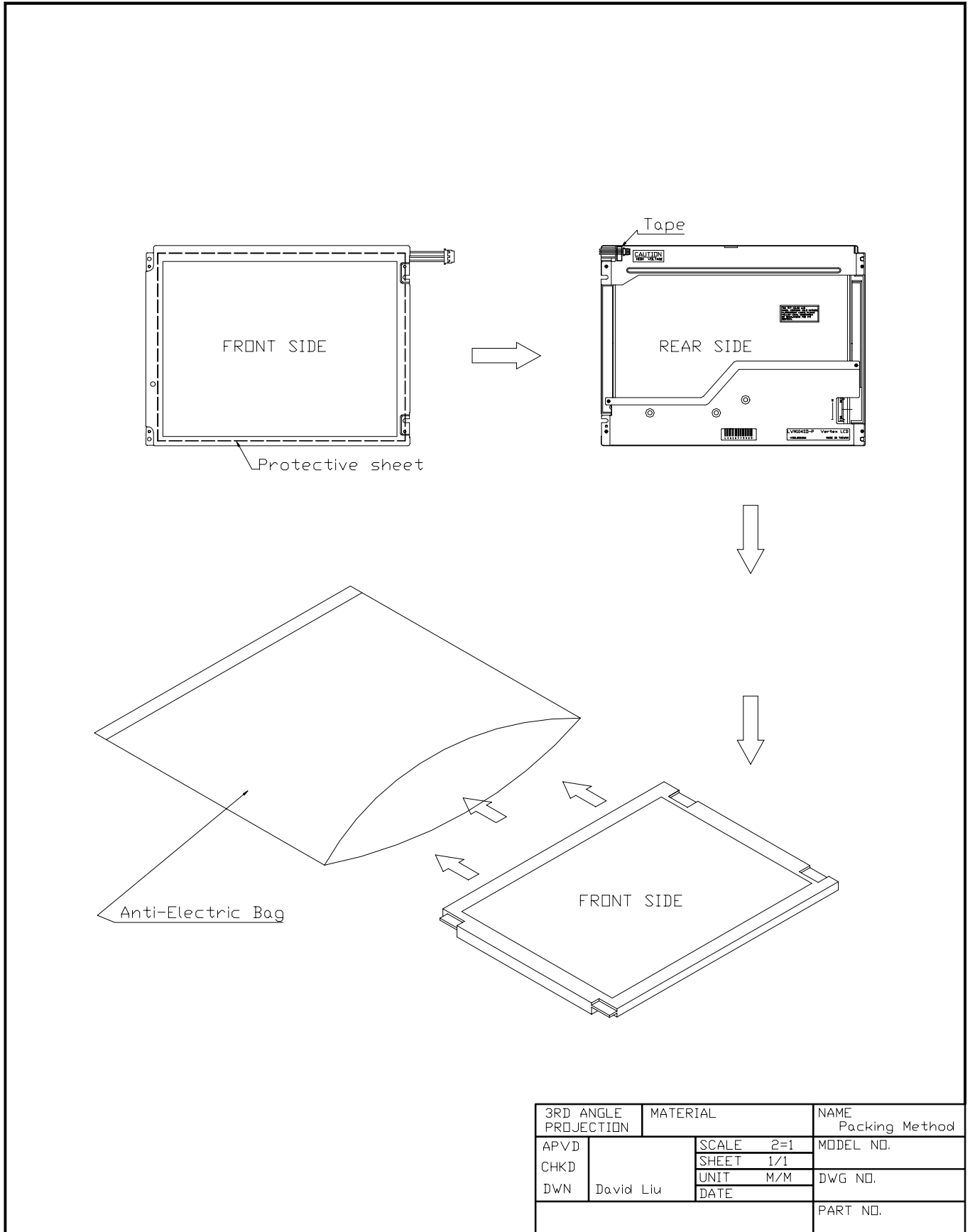
[Judgement Criteria]

Under the display quality test conditions with normal operation state , there should be no change which may affect practical display function.

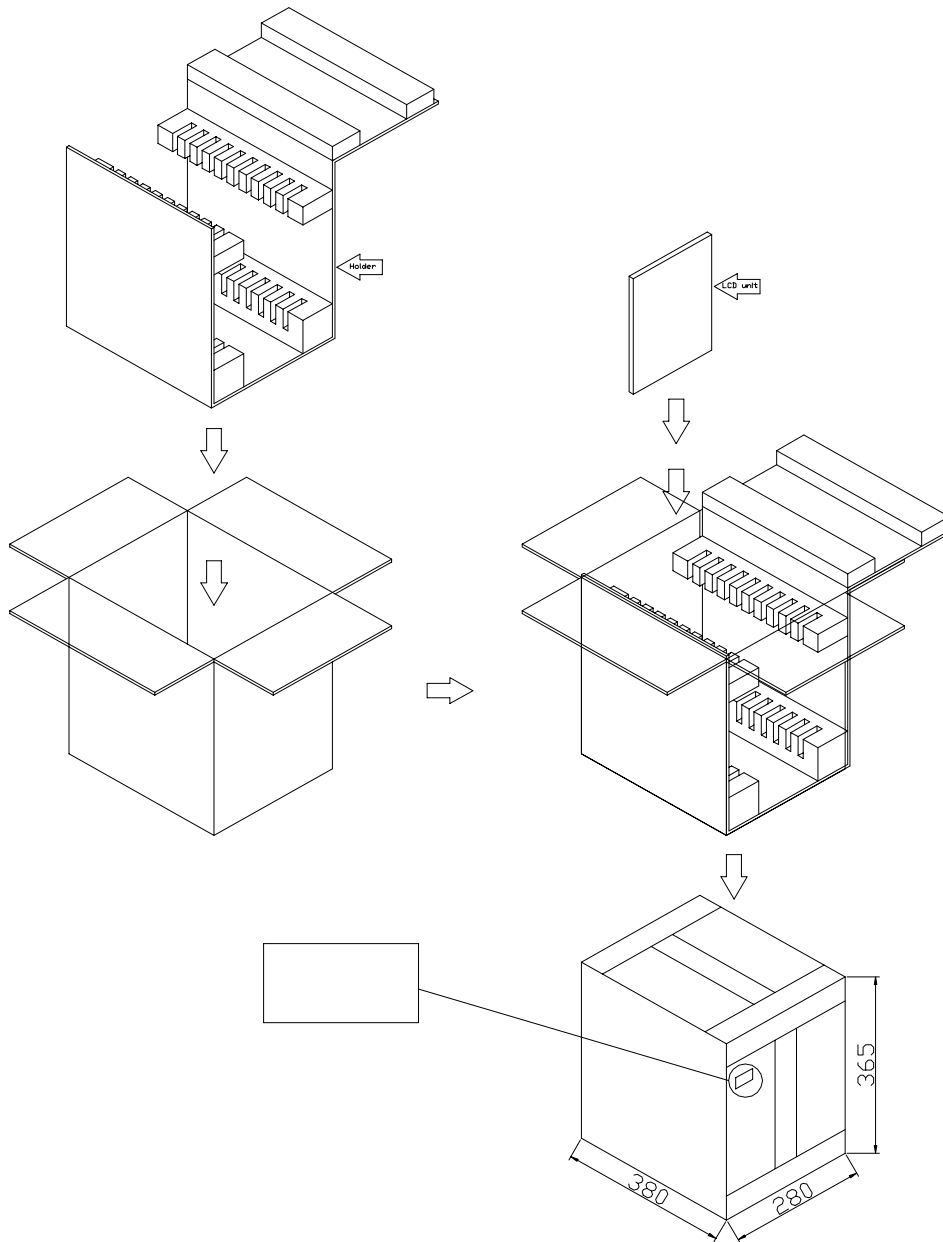
10. Block Diagram



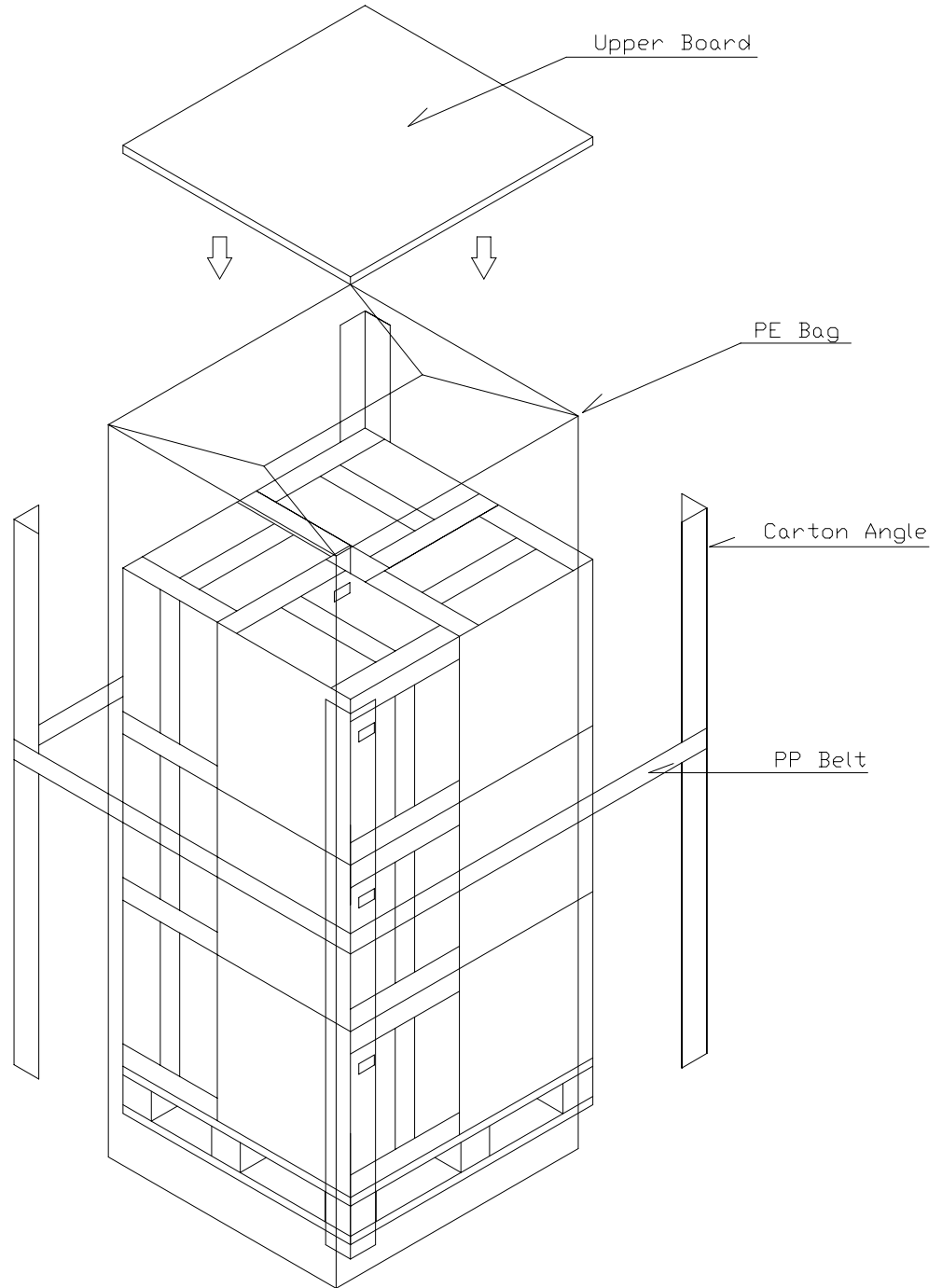
II)Packing



3RD ANGLE PROJECTION	MATERIAL	NAME Packing Method
APVD	SCALE 2=1	MODEL NO.
CHKD	SHEET 1/1	DWG NO.
DWN	UNIT M/M	PART NO.
	DATE	
	David Liu	



3RD ANGLE PROJECTION	MATERIAL	NAME Packing Method
APVD	David Liu	MODEL NO.
CHKD		SCALE 2=1
DWN		SHEET 1/1
		UNIT M/M
	DATE	DWG NO.
		PART NO.



3RD ANGLE PROJECTION		MATERIAL		NAME Packing Method	
APVD		SCALE	2=1	MODEL NO.	
CHKD		SHEET	1/1	DWG NO.	
DWN	David Liu	UNIT	M/M	DATE	
				PART NO.	

Revision History

Rev.	Issued Date	Revised Content
1.0	Apr.25, 2001	New
1.1	May 28,2001	7-1) Add LCD panel life(MTBF) 50000 Hrs
1.2	Jun 18,2001	5-2) Modify back light pin define
1.3	Jun 29,2001	4)Modify Mechanical Drawing