TECHNICAL SPECIFICATION

MODEL NO. : PD104SL3

☐ Customer's Confirmation

Customer _____

Date _____

By _____

☐ PVI's Confirmation

Dep	FAE	Panel Design	Electronic Design	Mechanical Design	Product Verification	Prepared by
Sign	劉豐	劉	施建嘉 金世坤	申峰 林夏	張我	楊亮

PRIME VIEW

PD104SL3

TECHNICAL   SPECIFICATION

CONTENTS

1.Application

This data sheet applies to a color TFT LCD module, PD104SL3.

PD104SL3 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.
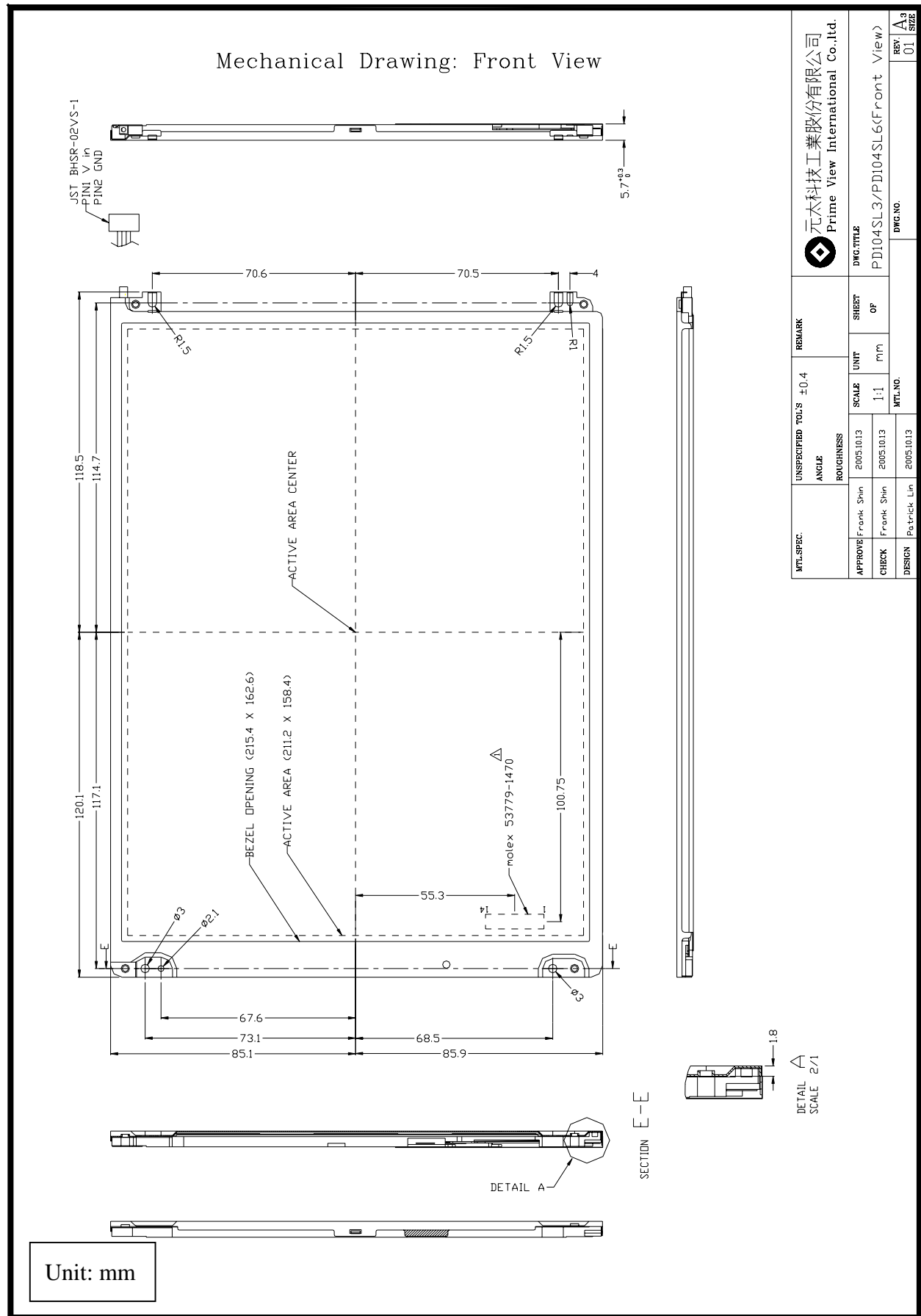
2. Features

. 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: THC63LVDF64A as receiver
. +3.3V DC supply voltage for TFT LCD panel driving
. Backlight driving DC/AC inverter not included in this module
.Long Life Lamp

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	238.6 (w)×171.0(H)×6.0(typ.) (D)	mm
Weight	310(typ.),320(max.)	g
Back-light	Single CCFL, side-light type	
Surface treatment	Anti-glare and hard-coating	
Display mode	Normally white	

4. Mechanical Drawing of TFT-LCD Module

Mechanical Drawing: Front View

JST BHSR-02VS-1
PIN1 V in
PIN2 GND

$5.7^{+0.3}_{0}$

70.6

70.5

4

R1.5

R1.5

R1

118.5

114.7

ACTIVE AREA CENTER

120.1

117.1

BEZEL OPENING (215.4 X 162.6)

ACTIVE AREA (211.2 X 158.4)

molex 53779-1470

100.75

55.3

14

Ø3

Ø2.1

Ø3

67.6

73.1

68.5

85.1

85.9

SECTION E-E

DETAIL A

1.8

DETAIL
SCALE 2/1

Unit: mm

元太科技工業股份有限公司
Prime View International Co.,ltd.

REMARK

UNSPECIFIED TOL'S ±0.4

ANGLE

ROUGHNESS

MTL.SPEC.

APPROVE Frank Shin 2005.10.13

CHECK Frank Shin 2005.10.13

DESIGN Patrick Lin 2005.10.13

SCALE 1:1

UNIT mm

MTL.NO.

SHEET OF

DWG.TITLE PD104SL3/PD104SL6(Front View)

DWG.NO.

REV. 01

SIZE A3

5. Input Terminals

5-1) TFT-LCD Panel Driving

Connector type: Molex 53779-1470

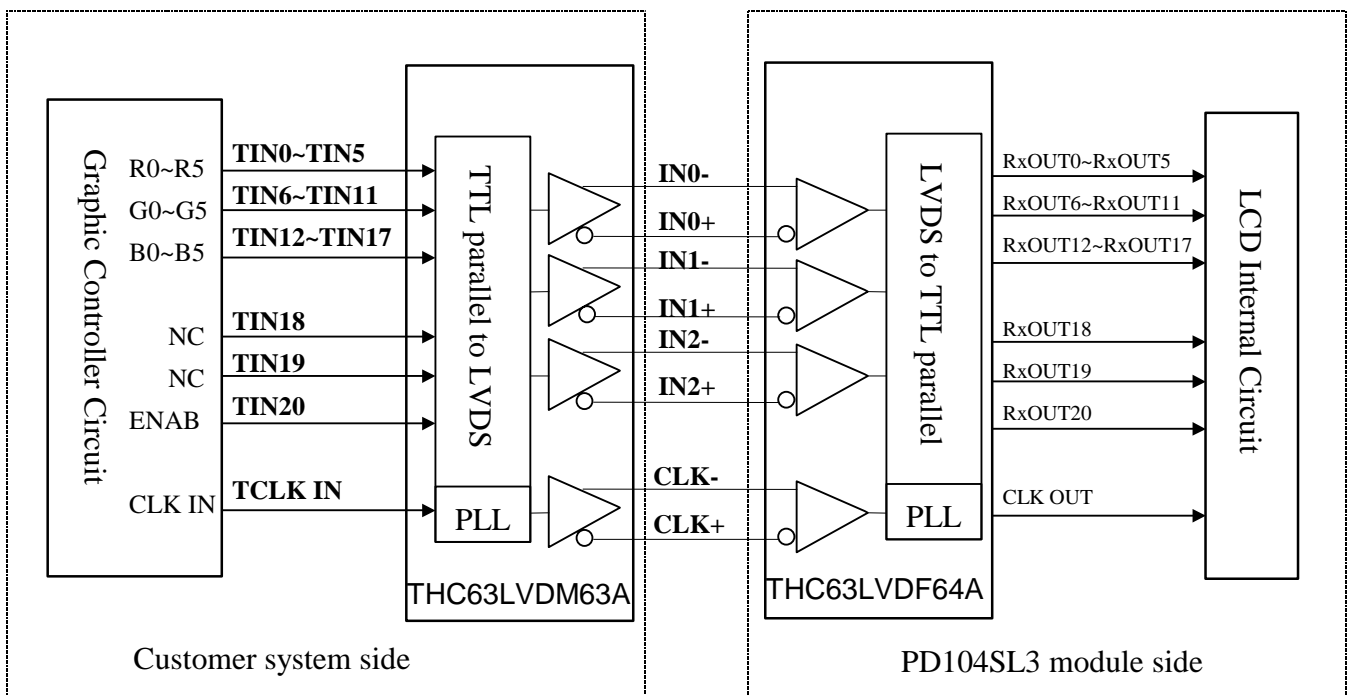| Pin No.	Symbol	Function	Remark
1	VDD	Power supply : +3.3V	
2	VDD	Power supply : +3.3V	
3	GND		
4	GND		
5	IN0-	Pixel data Transmission pair 0 (negative -)	
6	IN0+	Pixel data Transmission pair 0 (positive +)	
7	IN1-	Pixel data Transmission pair 1 (negative -)	
8	IN1+	Pixel data Transmission pair 1 (positive +)	
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 (THC63LVDM63A Thine) to PD104SL3 interface Assignment:

Input terminal of THC63LVDM63A		Graphic controller output signal		Output signal symbol	To PD104SL3 interface terminal(Symbol)
Symbol	No.	Symbol	Function		
TIN0	44	R0	Red pixel data (LSB)		
TIN1	45	R1	Red pixel data		
TIN2	47	R2	Red pixel data	Tout0- ——	No.5 : IN0-
TIN3	48	R3	Red pixel data		
TIN4	1	R4	Red pixel data	Tout0+ ——	No.6 : IN0+
TIN5	3	R5	Red pixel data(MSB)		
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	Tout1- ——	No.7 : IN1-
TIN10	10	G4	Green pixel data		
TIN11	12	G5	Green pixel data(MSB)	Tout1+ ——	No.8 : IN1+
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		
TIN16	19	B4	Blue pixel data	Tout2- ——	No.9 : IN2-
TIN17	20	B5	Blue pixel data(MSB)		
TIN18	22	NC	No connection	Tout2+ ——	N0.10 : IN2+
TIN19	23	NC	No connection		
TIN20	25	ENAB	Compound Synchronization signal		
CLK in	26	NCLK	Data sampling clock	TCLK out- TCLK out+	No.11 : CLK IN- No.12 : CLK IN+

Data stream of IN0-/+, IN1-/+ and IN2-/+ for PD104SL3

IN0

RxOUT6	RxOUT5	RxOUT4	RxOUT3	RxOUT2	RxOUT1	RxOUT0
G0	R5	R4	R3	R2	R1	R0

IN1

RxOUT13	RxOUT12	RxOUT11	RxOUT10	RxOUT9	RxOUT8	RxOUT7
B1	B0	G5	G4	G3	G2	G1

IN2

RxOUT13	RxOUT12	RxOUT11	RxOUT10	RxOUT9	RxOUT8	RxOUT7
ENAB	NC	NC	B5	B4	B3	B2

LVDS Interface Block Diagram

THC63LVDM63A

THC63LVDF64A

Customer system side

PD104SL3 module side

5-2) Backlight driving

Connector type : "BHSR-02VS-1" of Japan Solderless Terminal MFG Co. LTD

PIN NO.	Symbol	Description	Remark
1	VL1	Input Voltage(High)	
2	VL2	Input Voltage(Low)	

6. Absolute Maximum Ratings:

GND=0V, Ta=25

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	+70		Note 6-2
Operating Temperature	T_{OP}	0	+60		

Note 6-1: LVDS signal
Note 6-2: Humidity : 90% RH Max. at Ta $\leq$ 40 .
Maximum wet-bulb temperature is at 39 or less at Ta > 40 and no condensation.

7. Electrical Characteristics

7-1) Recommended Operating Conditions: GND = 0V   Ta = 25

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage	VDD	3.0	3.3	3.6	V	
Current Dissipation	I_{DD}	-	350	450	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	5.0	7.0	mA	5mA : 160 cd/m2 Note 7-3 Note 7-6
Lamp Voltage	V_L	450	500	550	Vrms	I_{FL}=5mA Note 7-3
Kick-off voltage (Reference Value)	V_{SFL}	-	-	1340	Vrms	at Ta=25°C Note 7-4
		-	-	1750		at Ta=0°C
Lamp Driving Frequency	F_L	45	60	80	KHz	
Total power consumption (at I_{FL}=5mA)		--	3.6	-	W	Note 7-5

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

Note 7-2 : Please refers to THC63LVDF64A specification by Thine Corporation. This LCD module conforms to LVDS standard.

Note 7-3 : The back-light driving waveform should be as closed to sine-wave as possible.
 In order to satisfy the quality of B/L , no matter use what kind of inverter , the output lamp   current must between Min. and Max. to avoid the abnormal display image caused by B/L.

Note 7-4 : The kick-off times   1sec.

Note 7-5 : Not including the efficiency of backlight DC/AC inverter

Note 7-6 : Lamp current is measured with current meter for high frequency as shown below
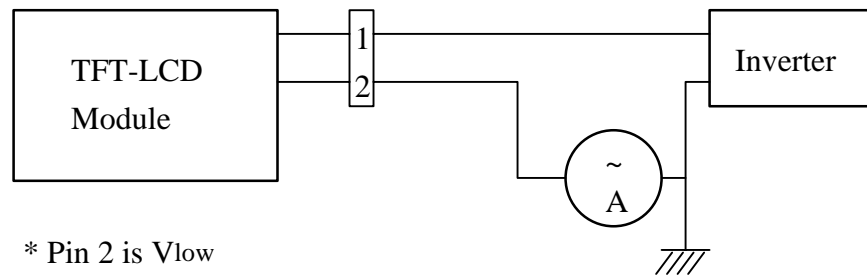
* Pin 2 is Vlow
** Current meter :
  Yokogawa 2016-01

Lamp current dissipation testing configuration

7-2) Input / Output signal timing chart
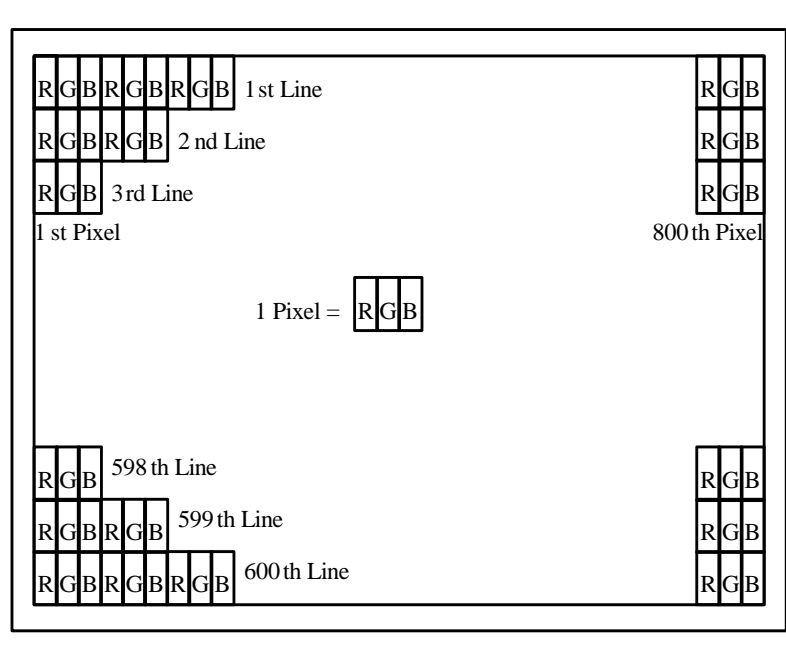
(A) Vertical Timing
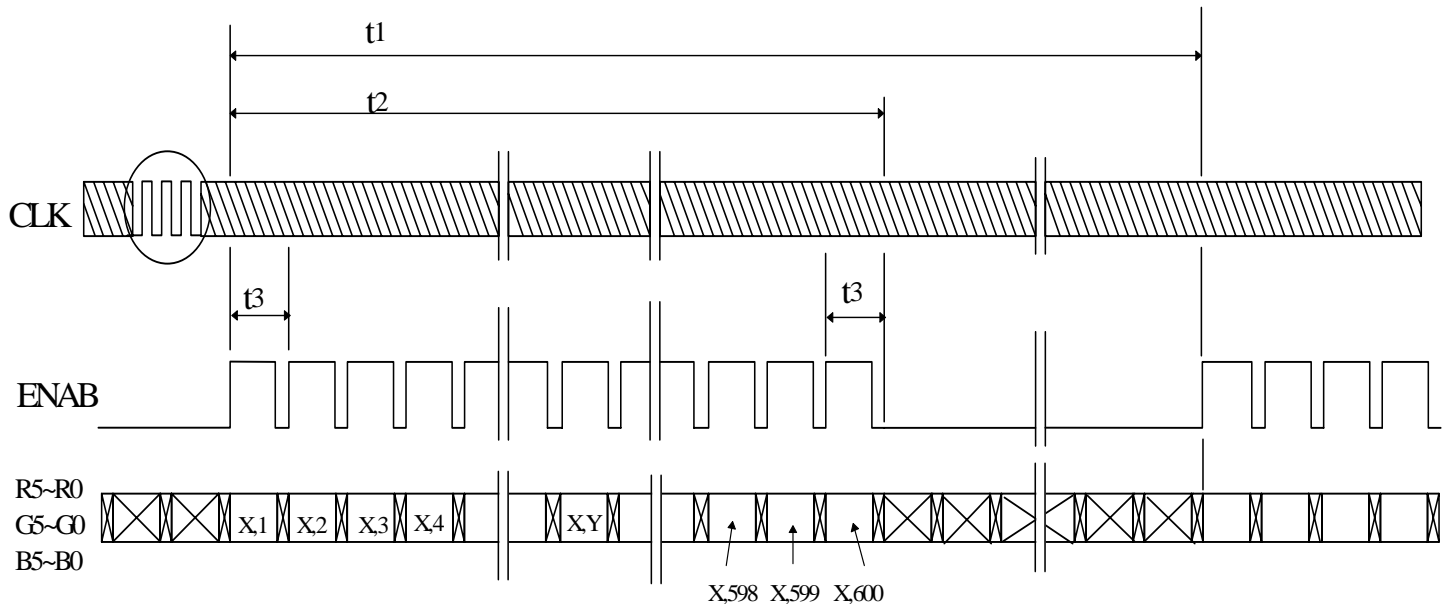
(B) Horizontal Timing

Duty (a,b) : 50 ± 10%
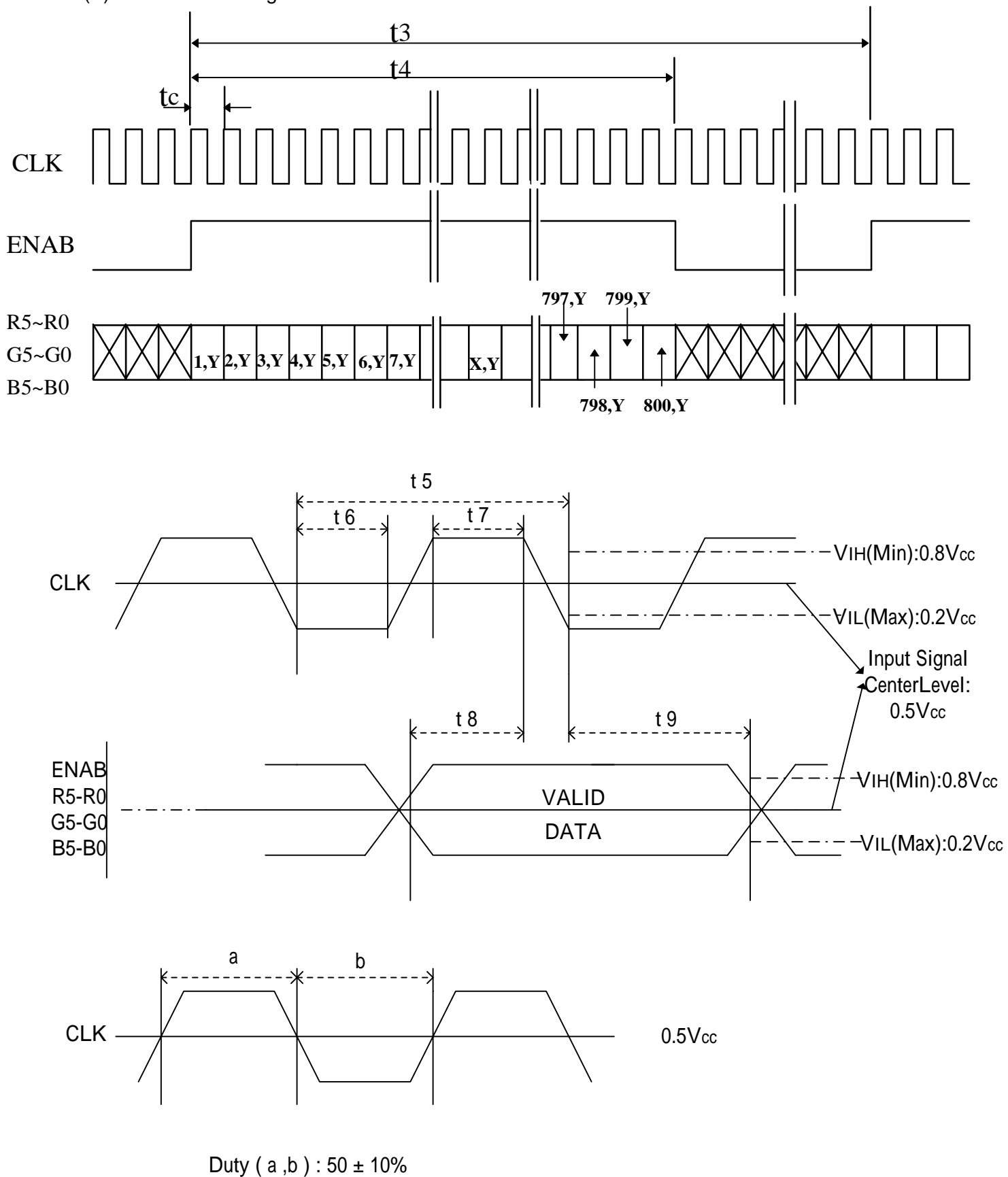
C) Timing Specifications

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Frame Cycling	t1	604 X t3	628X t3	800 X t3	-	
		-	16.58		ms	
Vertical Display Period	t2	600 X t3	600 X t3	600 X t3	-	
Horizontal Scanning Time	t3	920 X t5	1056 X t5	1064 X t5	-	
			26.4	-	μ s	
Horizontal Display Period	t4	-	800 X t5	-	-	
Clock Cycle	t5		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.

R	G	B	R	G	B	R	G	B	1 st Line
R	G	B	R	G	B	2 nd Line
R	G	B	3 rd Line

1 st Pixel   800 th Pixel

1 Pixel = | R | G | B |

R	G	B	598 th Line
R	G	B	R	G	B	599 th Line
R	G	B	R	G	B	R	G	B	600 th Line

8.)Power On Sequence
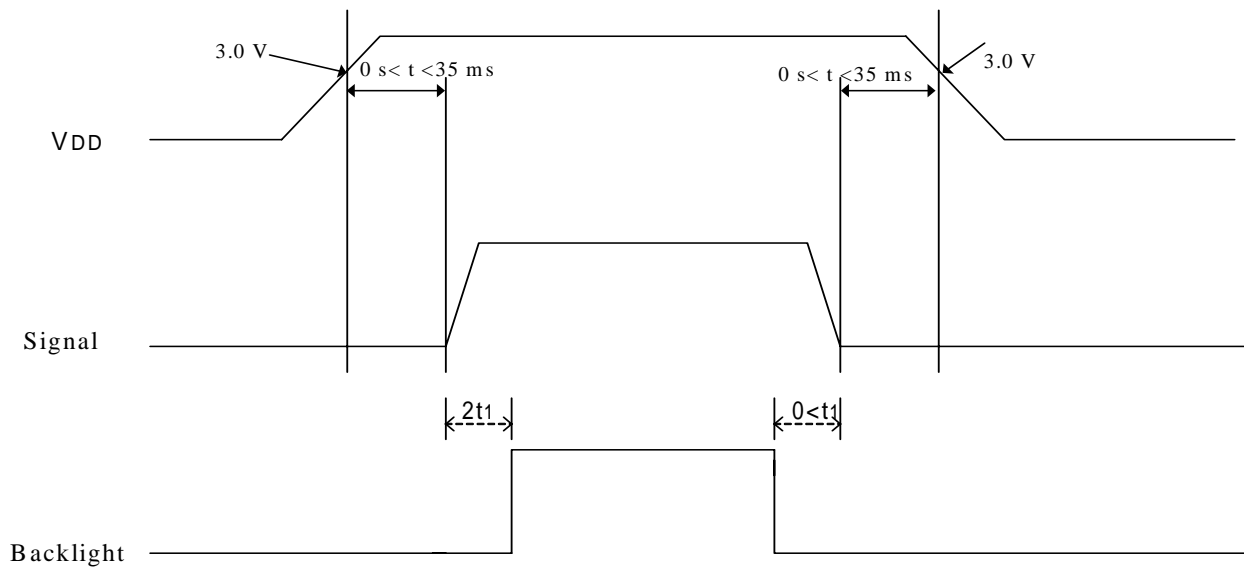
1. The supply voltage for input signals should be same as V_{DD}.

2. When the power is off , please keep whole signals (ENAB,CLK, Data) low level
   or high impedance

9.) Optical Characteristics

9-1) Specification:

Ta = 25

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal		CR≥10	35	45	-	deg	Note 9-1
	Vertical	(to 12 o'clock)		10	15	-	deg	
		(to 6 o'clock)		25	40	-	deg	
Contrast Ratio		CR	Optimum direction	200	400	-	-	Note 9-2
Response time	Rise	Tr	=0°	-	15	50	ms	Note 9-4
	Fall	Tf	=0°	-	25	50	ms	
Luminance		L	=0°/ =0°	130	160	-	cd/	I_{FL}=5mA, Note 9-3
				180	200	-		I_{FL}=7mA, Note 9-3
Luminance Uniformity		U		55	80	-	%	Note 9-5
White Chromaticity		x		0.29	0.32	0.35	-	
		y		0.32	0.35	0.38	-	
Lamp Life Time				30000	40000	-	hr	I_{FL}=5mA
				15000	20000		hr	I_{FL}=7mA
Cross Talk Ratio		CTK		-	-	3.5	%	Note 9-6

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.

Photometer (TOPCON BM-5A or BM-7 fast)

500 mm +/- 50 mm

Field = 1°

TFT-LCD module

DC/AC Inverter
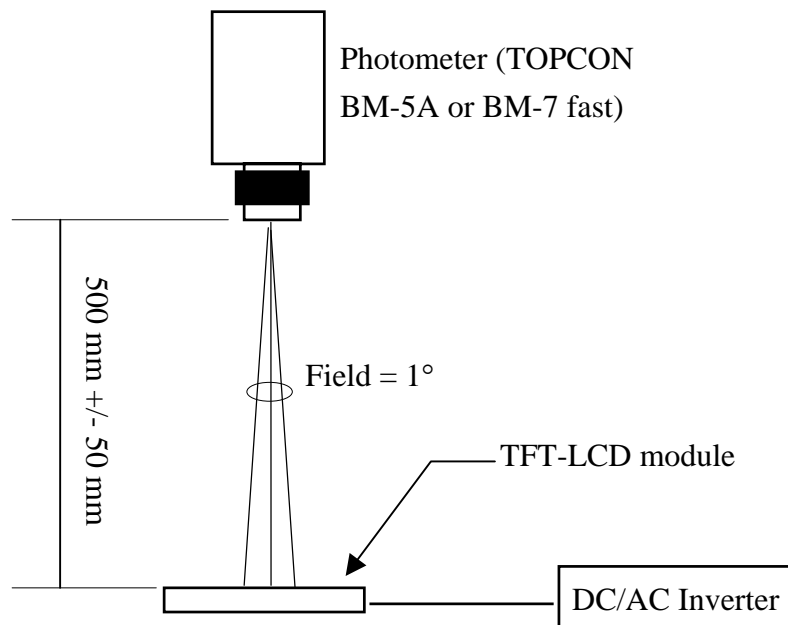
Optical characteristics measuring configuration

Note 9-1`   The definitions of viewing angles are as follows.
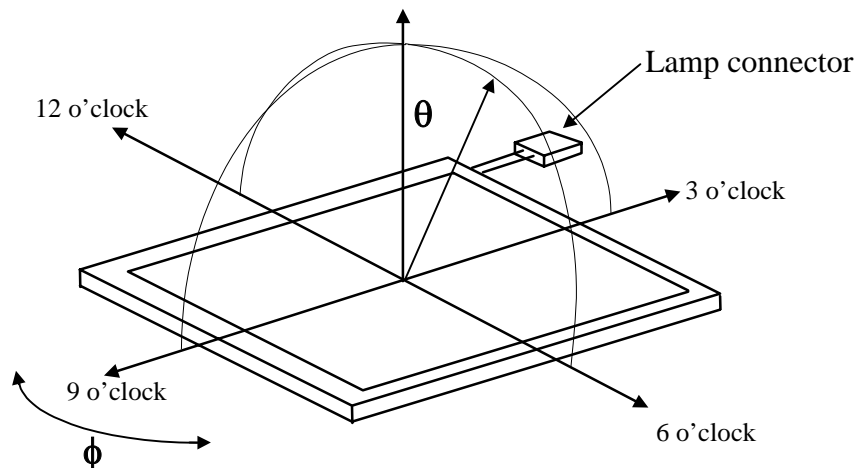
Note 9-2 : The definition of contrast ratio $CR = \dfrac{Luminance\ at\ gray\ level\ 63}{Luminance\ at\ gray\ level\ 0}$

Note 9-3   The typical luminance value is measured at lamp current 5.0&7.0 mA. The max
luminance value is measured at lamp current 7.0 mA.

Note 9-4: Definition of Response Time T_r and T_f:
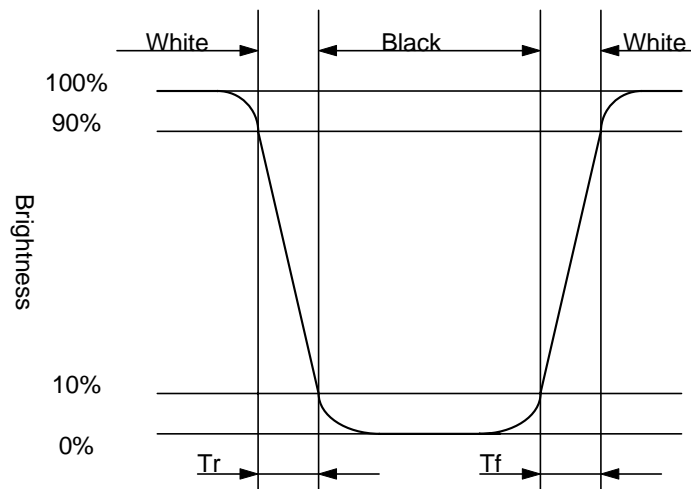
Note 9-5: The uniformity of LCD is defined as

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

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).

25%   50%   75%

25%

50%

75%
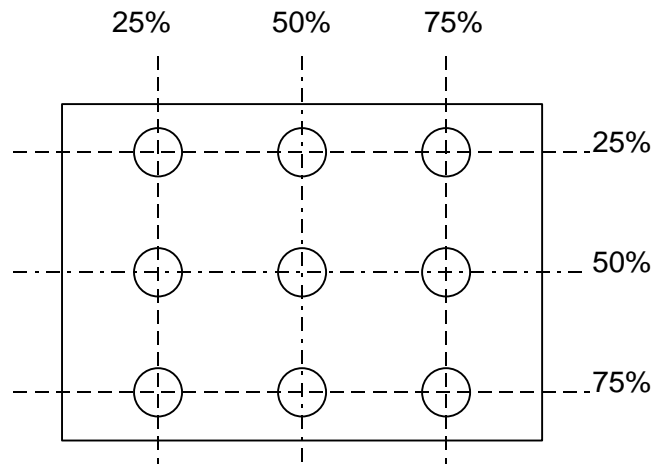
Note 9-6: Cross Talk (CTK) = $\dfrac{|YA\text{-}YB|}{YA} \times 100\%$

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

Pattern A

(Gray Level 31)

Pattern B

(Gray Level 31, central

black box exclusive)

YA

YB

1/3

1/3

1/3

1/3   1/3   1/3

Black

X: Measuring Point (A and B are at the same point.)

(Gray Level 0)
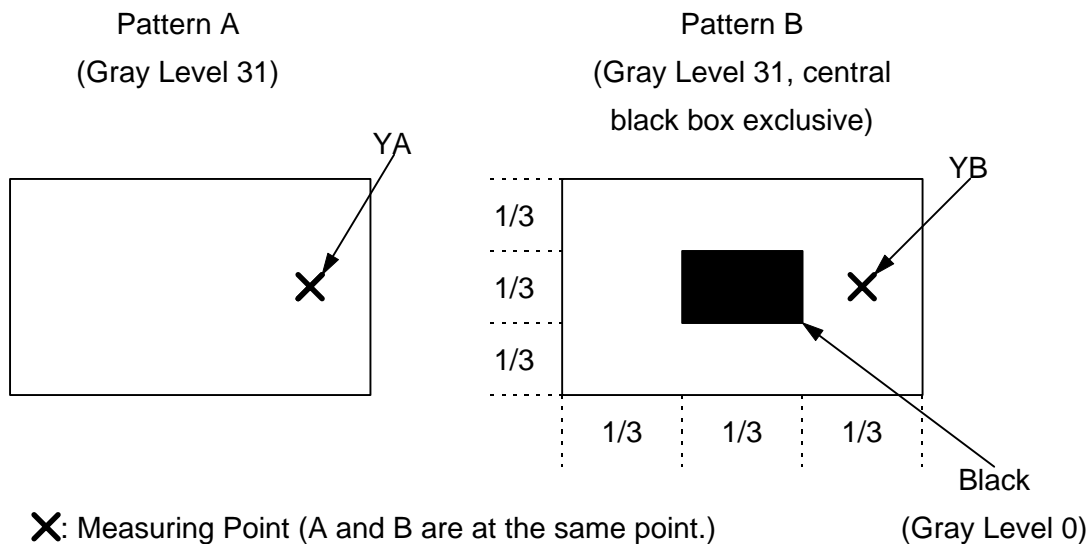
10. Handling Cautions

10-1) Mounting of module

a) Please power off the module when you connect the input/output connector.

b) Please connect the ground pattern of the inverter circuit surely. If the connection is not perfect, some following problems may happen possibly.

1. The noise from the backlight unit will increase.

2. The output from inverter circuit will be unstable.

3. In some cases a part of module will heat.

c) Polarizer which is made of soft material and susceptible to flaw must be handled carefully.

d) Protective film (Laminator) is applied on surface to protect it against scratches and dirts. It is recommended to peel off the laminator before use and taking care of static electricity.

10-2) Precautions in mounting

a) When metal part of the TFT-LCD module (shielding lid and rear case) is soiled, wipe it with soft dry cloth.

b) Wipe off water drops or finger grease immediately. Long contact with water may cause discoloration or spots.

c) TFT-LCD module uses glass which breaks or cracks easily if dropped or bumped on hard surface. Please handle with care.

d) Since CMOS LSI is used in the module. So take care of static electricity and earth yourself when handling.

10-3) Adjusting module

a) Adjusting volumes on the rear face of the module have been set optimally before shipment.

b) Therefore, do not change any adjusted values. If adjusted values are changed, the specifications described may not be satisfied.

10-4) Others

a) Do not expose the module to direct sunlight or intensive ultraviolet rays for many hours.

b) Store the module at a room temperature place.

c) The voltage of beginning electric discharge may over the normal voltage because of leakage current from approach conductor by to draw lump read lead line around.

d) If LCD panel breaks, it is possibly that the liquid crystal escapes from the panel. Avoid putting it into eyes or mouth. When liquid crystal sticks on hands, clothes or feet. Wash it out immediately with soap.

e) Observe all other precautionary requirements in handling general electronic components.

f) Please adjust the voltage of common electrode as material of attachment by 1 module.

11. Reliability Test

No	Test Item	Test Condition	Remark
1	High Temperature Storage Test	Ta = +70 , 240 hrs	
2	Low Temperature Storage Test	Ta = -20 , 240 hrs	
3	Low Temperature Operation Test	Ta = 0 , 240 hrs	
4	High Temperature & High Humidity Operation Test	Ta = +60 , 80%RH, 240 hrs (No Condensation)	
5	Thermal Cycling Test (non-operating)	0 ←→+60 , 100 Cycles 1Hr 1Hr	
6	Vibration Test (non-operating)	Frequency 10 ~ 57 H_z, Amplitude 0.15 mm 58~500Hz, 1G Sweep time: 11 min Test Period: 3 hrs (1 hr for each direction of X, Y, Z)	
7	Shock Test (non-operating)	80G, 6ms, X,Y, Z 1 times for each direction	
8	Electron Static Discharge	C=150pF,R=330 Contact=±8KV Air=±15KV 10 times/terminal	

Ta: ambient temperature
Note: The protective film must be removed before temperature test
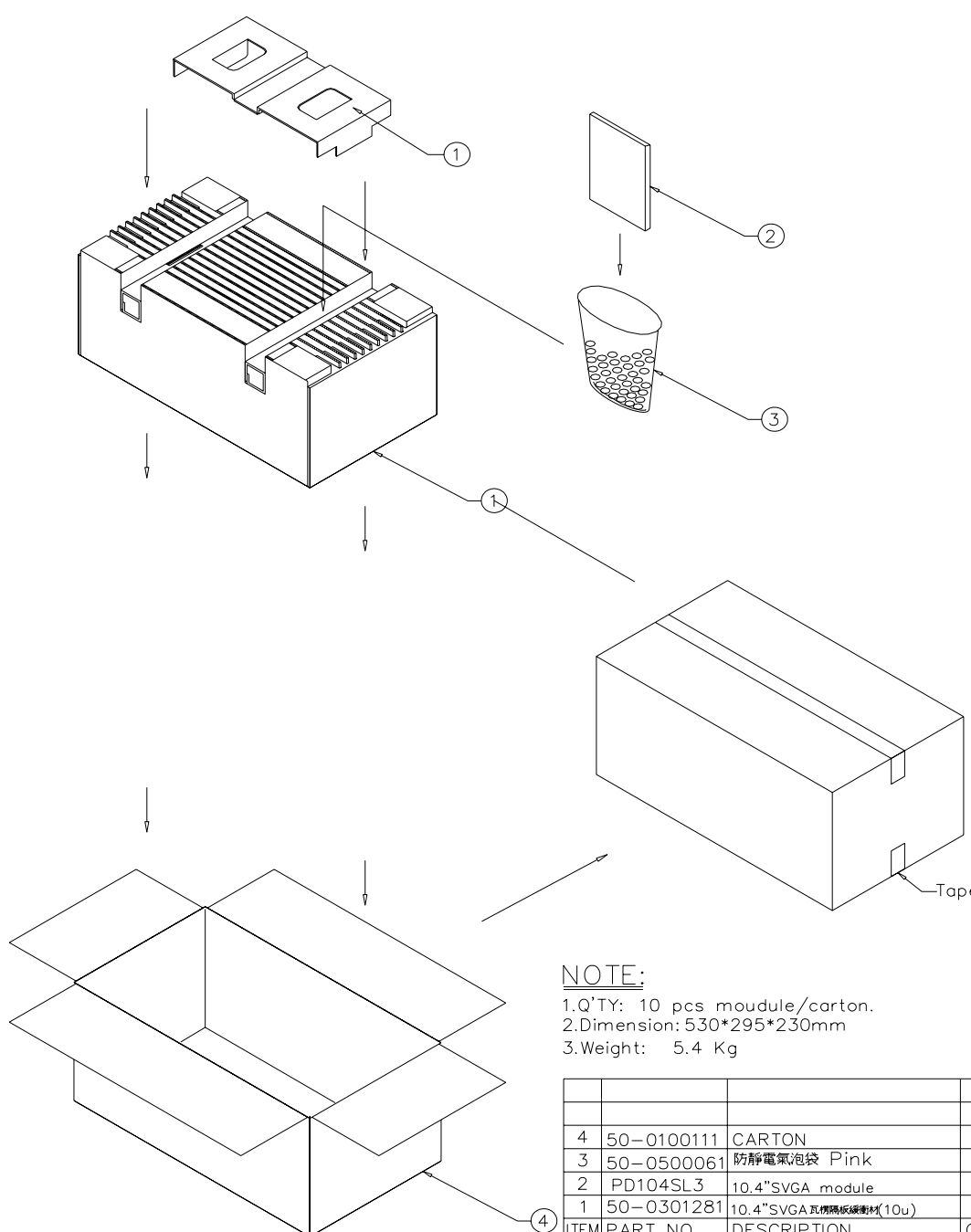
[Judgement Criteria]

1. Main LCD should normally work under the normally condition no defect of function,screen quality and appearance (including : mura ,line defect ,no image)

2. After the temperature and humidity test, the luminance and CR (Contrast ratio) ,should not be lower than minimum of specification.

3. After the vibration and shock test , can't be found chip broken.

12.Block Diagram
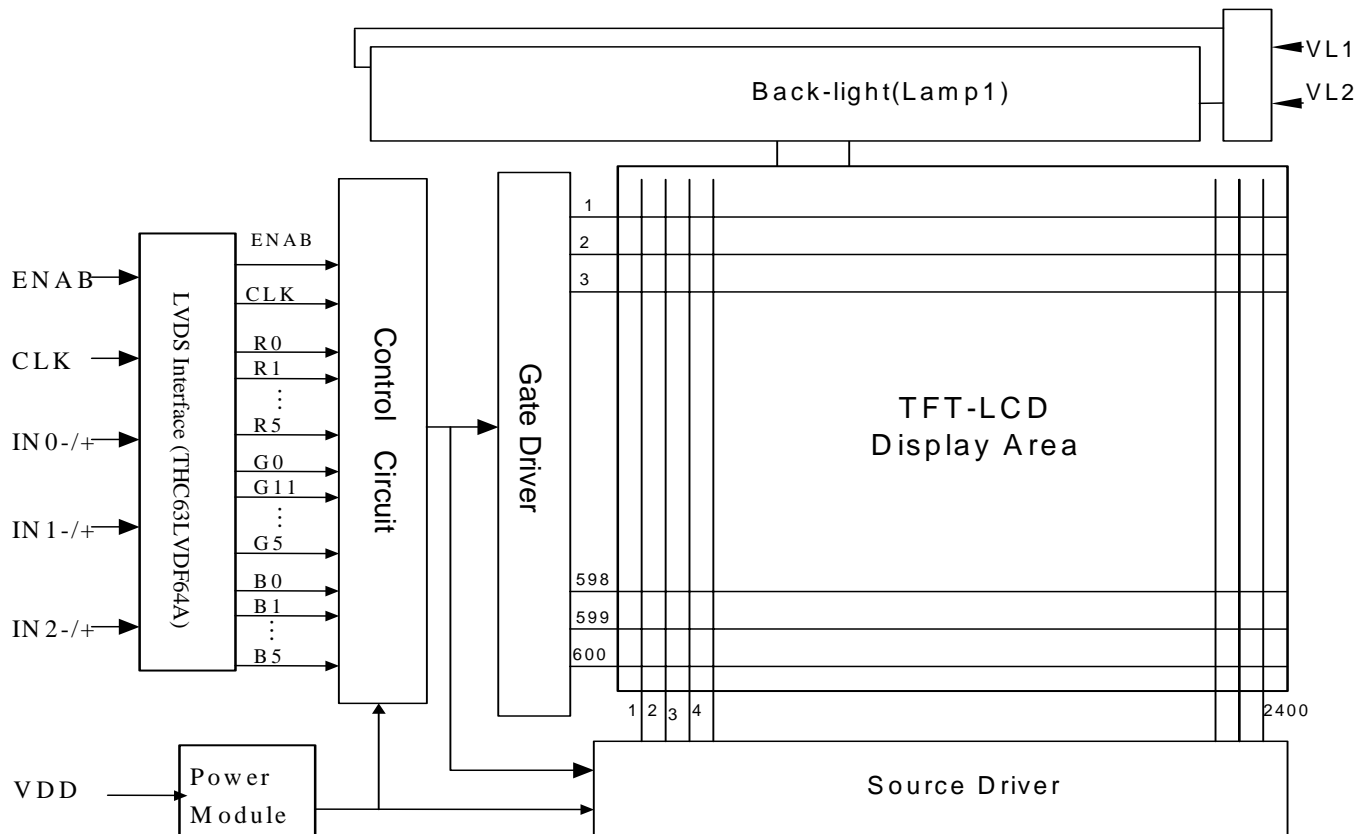
13.Packing

ZONE	REV.	DOCUUMENT NO.	DESCRIPTION	DATE	REV.BY

NOTE:
1.Q'TY: 10 pcs moudule/carton.
2.Dimension:530*295*230mm
3.Weight: 5.4 Kg

4	50-0100111	CARTON		1	
3	50-0500061	防靜電氣泡袋 Pink		10	抗靜電
2	PD104SL3	10.4"SVGA module		10	
1	50-0301281	10.4"SVGA瓦楞隔板緩衝材(10u)		1	上蓋+ 底座
ITEM	PART NO.	DESCRIPTION		QTY	REMARK

MTL.SPEC.	UNSPECIFIED TOL'S	REMARK	元太科技工業股份有限公司
	ANGLE		Prime View International Co., Ltd.
	ROUGHNESS		

APPROVE	Frank	'05.02.17	SCALE	UNIT	SHEET 1 OF 1	DWG.TITLE PD104SL3 MODULE PACKING
CHECK	Frank	'05.02.17				
DRAWN	Patrick	'05.02.17	MTL.NO.		DWG FILE:	REV. 02 / A4 SIZE

Revision History

Rev.	Issued Date	Revised Content
1.0	Sep 04, 2001	New
1.1	Nov 28,2001	Modify 7-1 Current Dissipation Max change from 500 to 450 Modify 10. Reliability Test High Temperature Storage Test change from 60 to 70 , High Temperature & High Humidity Operation Test change from 50 80RH to 60 80RH
1.2	Dec 27,2001	Add Page 17 : Handling Cautions
1.3	Mar 10,2003	Modify P10 : D) Timing Specifications 4. Frame Cycling max from 660×t3 to 800×t3 5. Horizontal scanning time min from. 844×t5 to 920×t5 Modify P14 : White Chromaticity X from 0.31 to 0.34 , y from 0.34 to 0.35 TC from 6600 K to 5200K
1.4	Nov 27,2003	Modify Page15 : 1.White Chromaticity : X from 0.34 to 0.32 . 6. TC Spec delete 7. Contrast Ratio Typ 180 to 400 ; Min 100 to 200 . Page19 : 1.Thermal Cycling test condtion : 0 ←→+25 ←→+60 , 50 Cycles to 0 ←→+60 , 100 Cycles 1Hr 0.5Hr 1Hr 1Hr 1Hr Add Page 18 : Indication of Lot Number Label
1.5	Oct. 04 , 2004	Modify Page07 : Rename Lamp initial voltage to Kick-off voltage add Note 7-4 : The kick-off times 1sec. Page20 : Packing
1.6	Jan.10 , 2005	Modify Page08 : Recommended Operating Condition table : Lamp Current,Lamp Voltage,Kick-off Voltage,Lamp driving frequency Total poer consumption. Delete : Page19 : Indication of Lot Number Label(Oracle system induction) Add : Page19 :Note: The protective film must be removed before temperature test.
1.7	Apr.26,2005	Modify Page08 : Current Lamp Voltage,Min change to 450, Max change to 550 Page21 : Packing-change to initial packing.
1.8	Oct.14,2005	Modify Page04: Mechanical Drawing of TFT-LCD Module (connector's part number).
1.9	Feb.16,2006	Add Page14: 9.) Optical Characteristics 9-1) Specification I_{FL}=7mA Luminance: 200 nit(TYP), 180nit(MIN) Lamp life time: 20000 hrs(TYP), 15000 hrs(MIN)