Version : 1.0

TECHNICAL SPECIFICATION

MODEL NO. : PD104SM1

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Please contact PVI or its agent for further information.

☐Customer's Confirmation

Customer

Date

By

FOR MORE INFORMATION:
AZ DISPLAYS, INC.
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☐PVI's Confirmation

Confirmed By

Prepared By

Revision History

Rev.	Issued Date	Eng.	Revised Contents
0.1	Jul. 07, 2008	吳昌霖	Preliminary
0.2	Sep. 19, 2008	吳昌霖	Add weight of LCD module Add gamma voltage Modify 8. Block Diagram Modify 9.Interface Timing Update lamp current from 5.0mA(typ.) to 5.5mA(typ.)
0.3	Oct. 16, 2008	吳昌霖	Brightness (min.) from 195(cd/m2) to 185(cd/m2)
0.4	Nov. 19, 2008	吳昌霖	7. Electrical Characteristics add IDD(typ.) = 260mA add Note 7-3：The minimum life of CCFL = 20,000hrs Delete 7-3) Gamma correction voltage 10. Optical Characteristics modify response time Tr(typ.)=10ms , Tr(max.)=15ms Tf(typ.)=15ms , Tf(max.)=25ms
1.0	Nov. 21, 2008	吳昌霖	New

TECHNICAL SPECIFICATION

CONTENTS

1. Application

This data sheet applies to a color TFT LCD module, PD104SM1.
PD104SM1 module applies to OA products, which require high quality flat panel display. If you must use in severe reliability environment, please don't extend over PVI's reliability test conditions.
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.

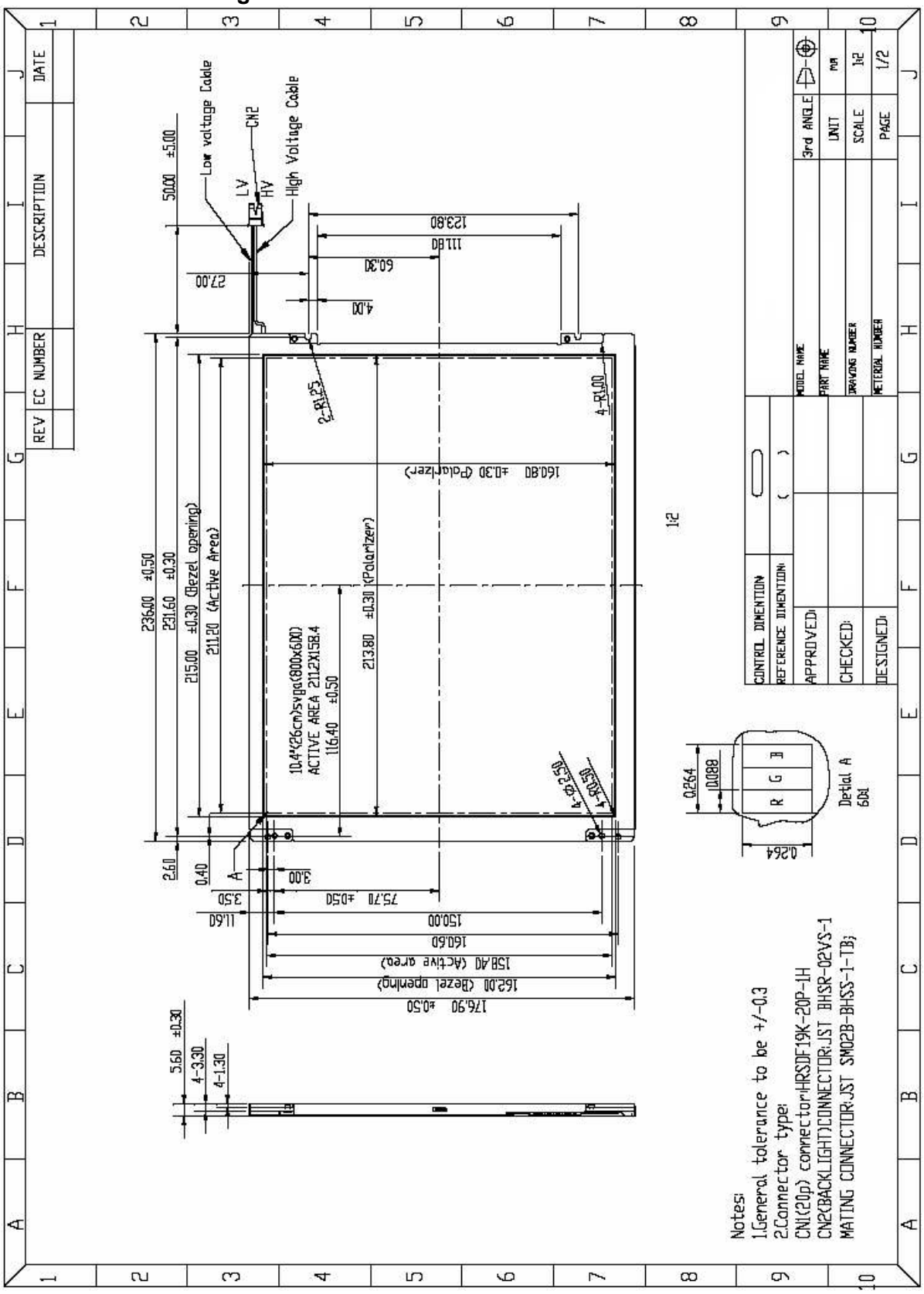
2. Features

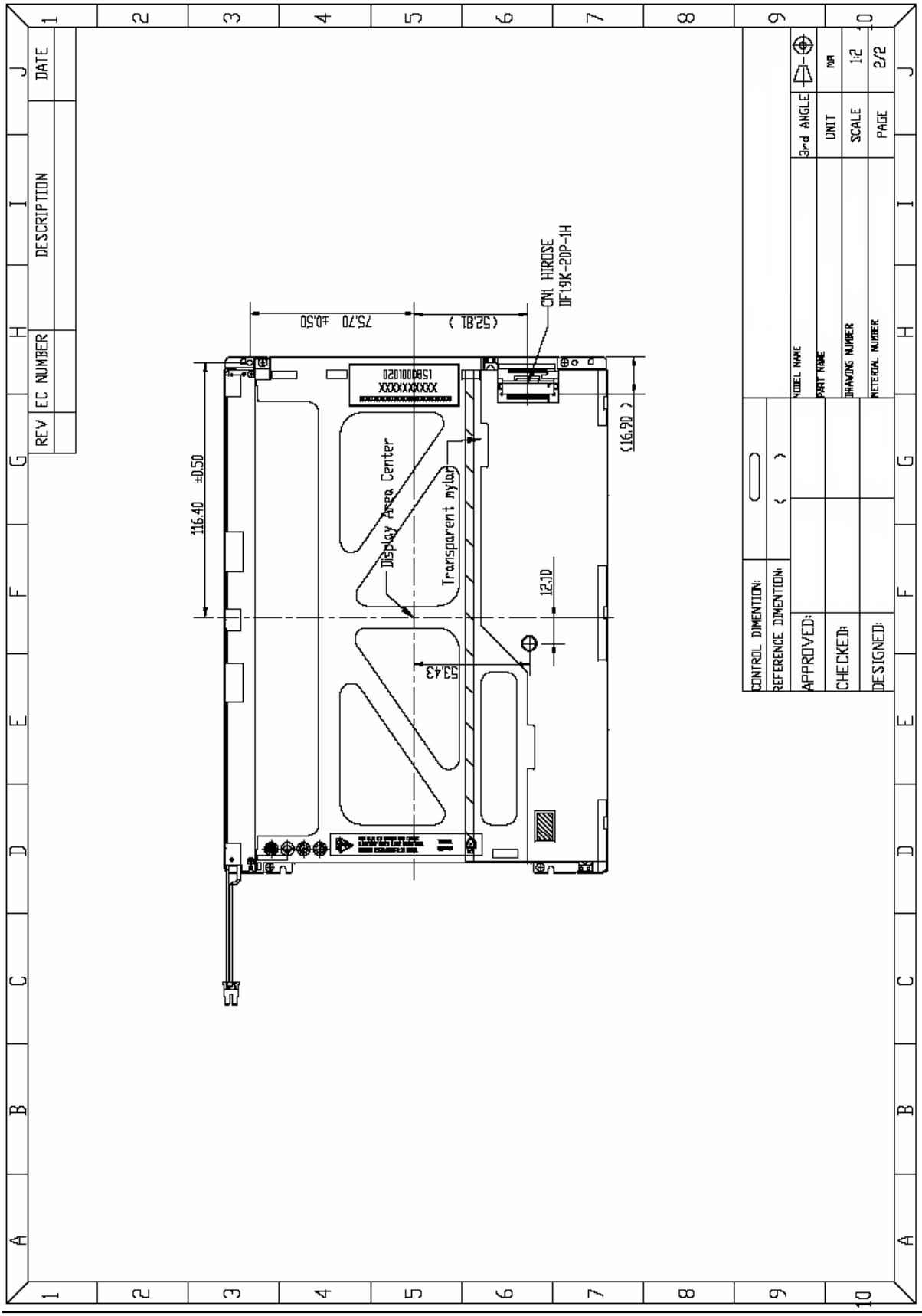
. SVGA (800*600 pixels) resolution
. Amorphous silicon TFT LCD panel with CCFL backlight
. Pixel in stripe configuration
. Thin and light weight
. Display Colors：262K colors
. Interface：LVDS 6 bit

3. Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	10.4 (diagonal)	inch
Display Format	800×(R,G,B)×600	dot
Display Colors	262K	
Active Area	211.2 (H)×158.4 (V)	mm
Pixel Pitch	0.264(H)×0.264(V)	mm
Pixel Configuration	Stripe	
Outline Dimension	236.0 (W)×176.9 (H)×5.6 (D) (typ.)	mm
Weight	288±15	g
Back-light	CCFL	
Surface treatment	Anti-Glare(3H)	
Display mode	Normally White	
Gray scale inversion direction	6 o'clock (ref to Note10-1)	

4. Mechanical Drawing of TFT-LCD Module





5. Input / Output Terminals

5-1) LVDS interface

Connector type：HIROSE DF19K-20P-1H(56)

Pin No	Symbol	I/O	Description	Remark
1	VDD	P	Power Supply	
2	VDD	P	Power Supply	
3	GND	P	Ground	
4	GND	P	Ground	
5	IN0-	I	LVDS receiver negative signal channel 0	Note 5-1
6	IN0+	I	LVDS receiver positive signal channel 0	Note 5-1
7	GND	P	Ground	
8	IN1-	I	LVDS receiver negative signal channel 1	Note 5-1
9	IN1+	I	LVDS receiver positive signal channel 1	Note 5-1
10	GND	P	Ground	-
11	IN2-	I	LVDS receiver negative signal channel 2	Note 5-1
12	IN2+	I	LVDS receiver positive signal channel 2	Note 5-1
13	GND	P	Ground	-
14	CLK-	I	LVDS receiver negative signal clock	Note 5-1
15	CLK+	I	LVDS receiver positive signal clock	Note 5-1
16	GND	P	Ground	-
17	NC	-	No connection	-
18	NC	-	No connection	-
19	GND	P	Ground	-
20	GND	P	Ground	-

I：input pin　　P：Power/GND

Note 5-1：Data mapping as follows：

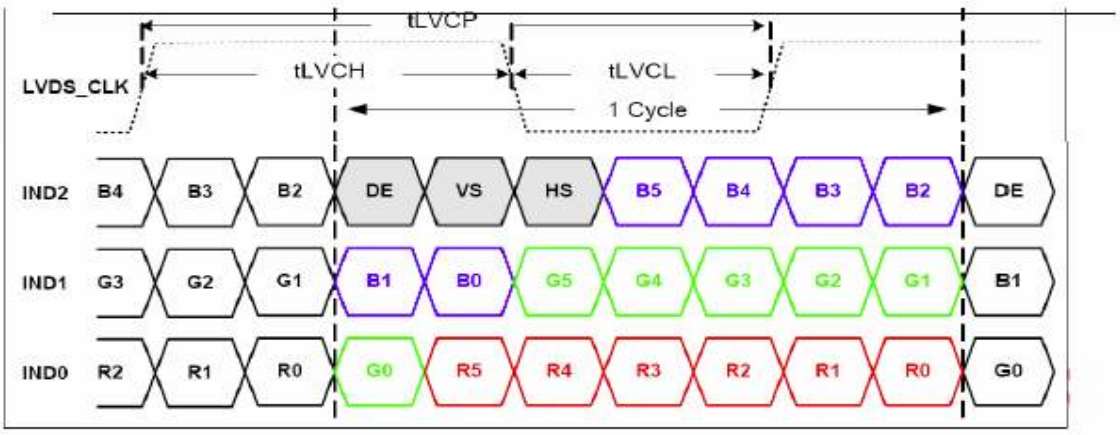


Figure 5-1 Input signal data mapping

5-2) CN2 (CCFL connector)

Pin No	Symbol	I/O	Description	Remark
1	VL1	P	CCFL power supply (high voltage)	Pink
2	VL2	P	CCFL power supply (GND)	White

6. Absolute Maximum Ratings:

Ta=25℃

Parameters	Symbol	MIN.	MAX.	Unit	Remark
Power Voltage	VDD	-0.3	5.0	V	
Input Voltage	V_{IN}	-0.3	5.0	V	Note 6-1
Operating Temperature	T_{OP}	-20	70	℃	
Storage Temperature	T_{ST}	-30	80	℃	

Note 6-1：V_{IN} represent IN0±, IN1±, IN2±, CLK±

7. Electrical Characteristics

7-1) LVDS Module Electrical Characteristics：

GND=0V,Ta=25℃

Item		Symbol	MIN	TYP	MAX	Unit	Remark
LVDS Differential input high threshold		V_{TH}	-	-	+100	mV	V_{CMLVDS}=1.2V
LVDS Differential input low threshold		V_{TL}	-100	-	-	mV	V_{CMLVDS}=1.2V
Differential input voltage		$\|V_{ID}\|$	0.1	-	0.6	V	
LVDS input common mode voltage		V_{CMLVDS}	$\|V_{ID}\|/2$	-	1.4-($\|V_{ID}\|/2$)	V	
Input current		I_{IN}	-10	-	10	uA	
Supply Voltage		VDD	3.0	3.3	3.6	V	
Input Signal Voltage	Low Level	V_{IL}	0	-	0.4	V	
	High Level	V_{IH}	1.4	-	VDD	V	
Output Signal Voltage	Low Level	V_{OL}	-	-	0.4	V	
	High Level	V_{OH}	0.7*VDD	-	VDD	V	
Common Electrode Driving Signal		VCOM	-	4.36	-	V	Note 7-1
Sync Frequency		FVD	-	60	70	Hz	
VDD Power Consumption		I_{DD}	-	**260**	380	mA	Note 7-2

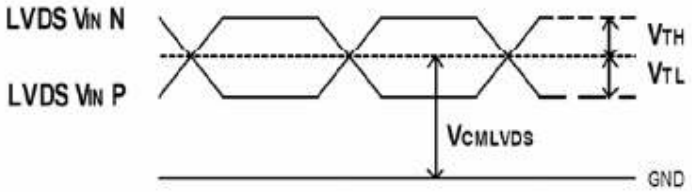


Figure 7-1 LVDS DC timing diagram

Note 7-1：The value may be different for different LCM.

Note 7-2：To test the current dissipation, using the “color bar” testing pattern shown as below：

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

1	2	3	4	5	6	7	8

Figure 7-2 Current dissipation testing pattern

7-2) Backlight Unit

Ta=25℃

Parameter	Symbol	MIN	TYP	MAX	Unit	Remark
Lamp voltage	VL	468	520	572	Vrms	
Lamp current	IL	3.0	5.5	7.0	mA	
Lamp start voltage	VLS	-	-	890	Vrms	Note 7-6
Lamp frequency	FL	40	60	80	KHz	

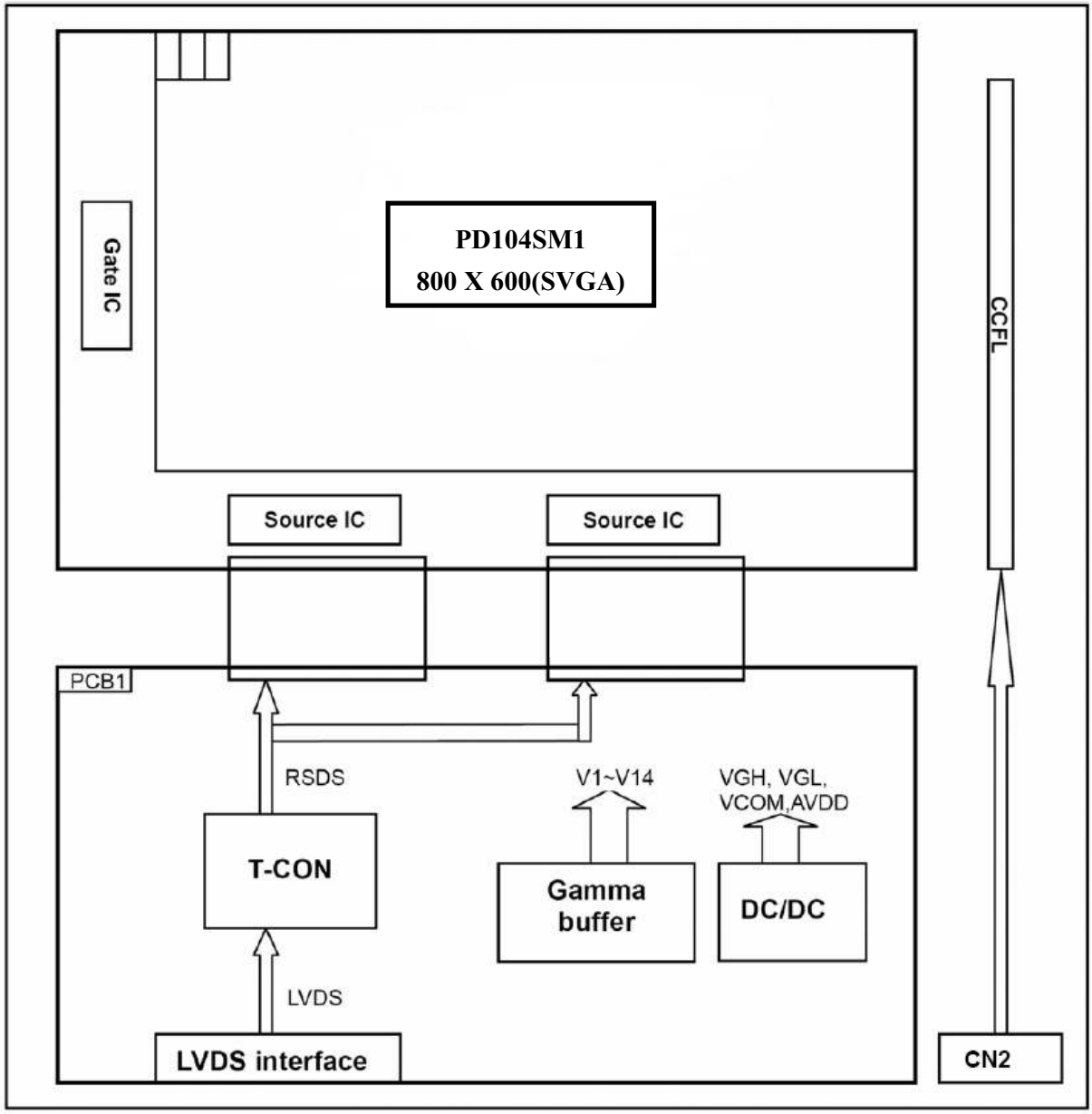
Note 7-3：The minimum life of CCFL = 20,000hrs

Note 7-4：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 7-5：The waveform of lamp driving voltage should be as closed to a perfect sine wave as possible.

Note 7-6：The” Max “ of “starting voltage ” means the minimum voltage of inverter to turn on the CCFL, and it should be applied to the lamp for more than 1 second to start up. Otherwise the lamp may not be turned on.

8. Block Diagram



9. Interface Timing

9-1) LVDS input timing

Item	Symbol	MIN	TYP	MAX	Unit	Condition
Clock period	tLVCP	20.0	25	31.25	ns	
Clock high time	tLVCH	-	14.29	-	ns	
Clock low time	tLVCL	-	10.71	-	ns	
PLL wake-up time	tLVPLL	-	-	1	ms	
Input skew marign	tLVSKM	400	-	-	ps	f=85MHz

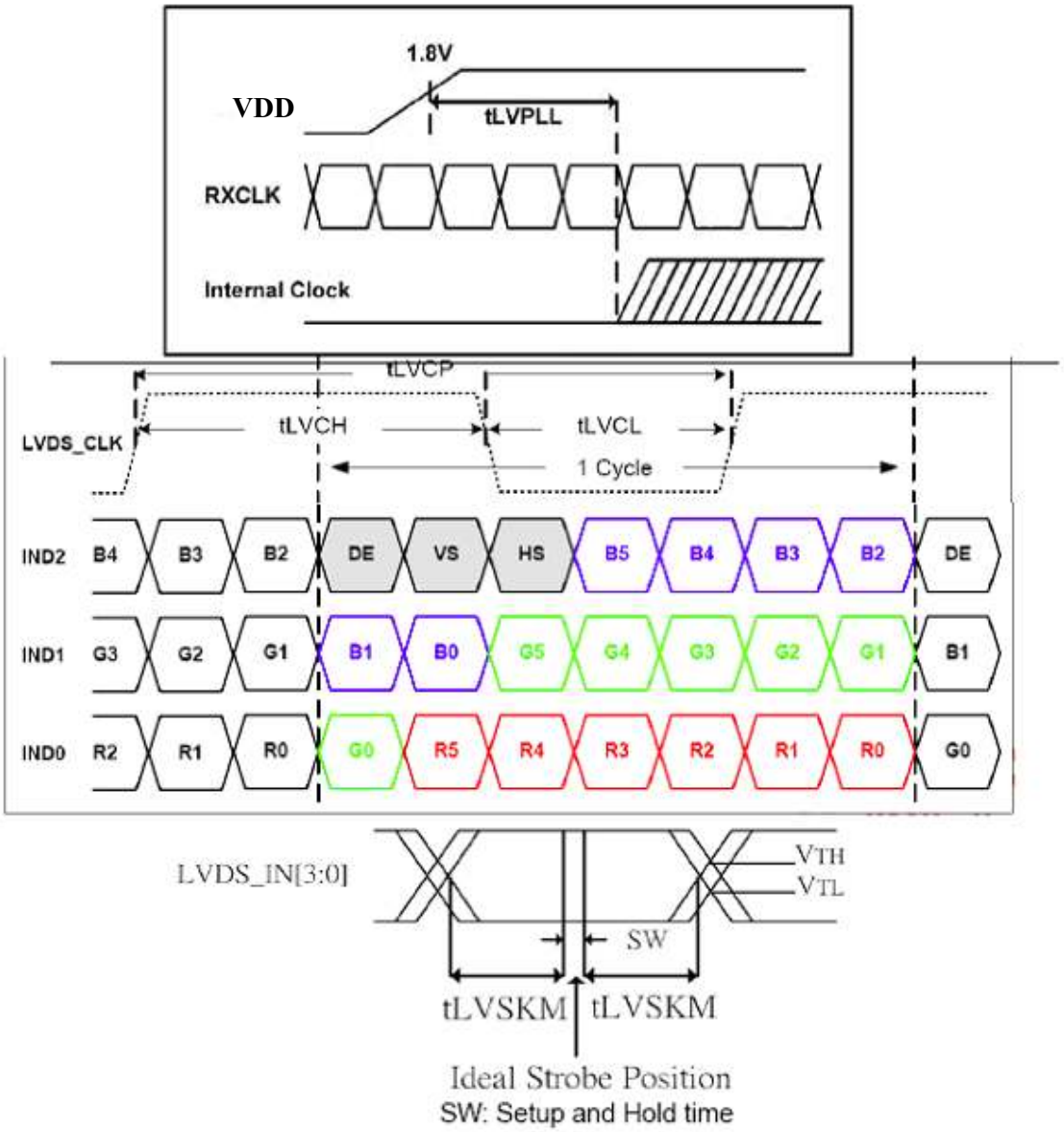


Figure 9-1 input signal data timing

9-2) LVDS INTERFACE POWER ON/OFF

Item	Symbol	MIN	TYP	MAX	Unit	Remark
VDD 3.0V to signal starting	Tp1	0	-	30	ms	
Signal starting to backlight on	Tp2	0	-	-	ms	
Signal off to **VDD** 3.0V	Tp3	0	-	30	ms	
Backlight off to signal off	Tp4	0	-	-	ms	

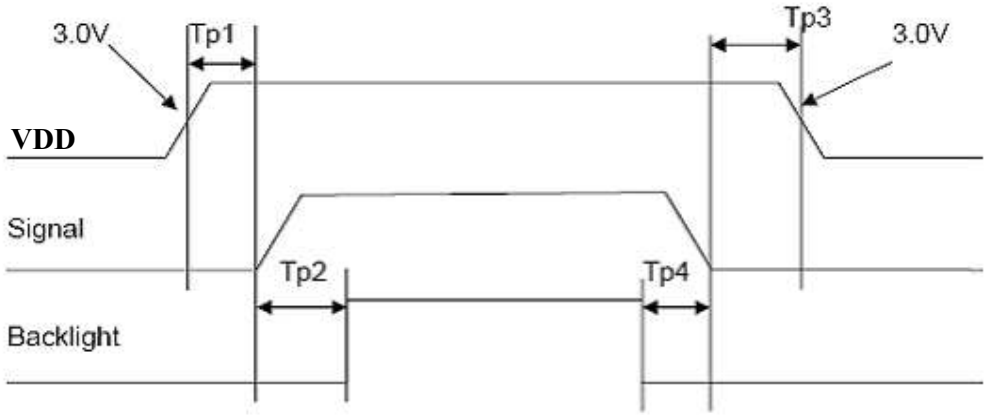


Figure 9-2 Interface power on/off sequence

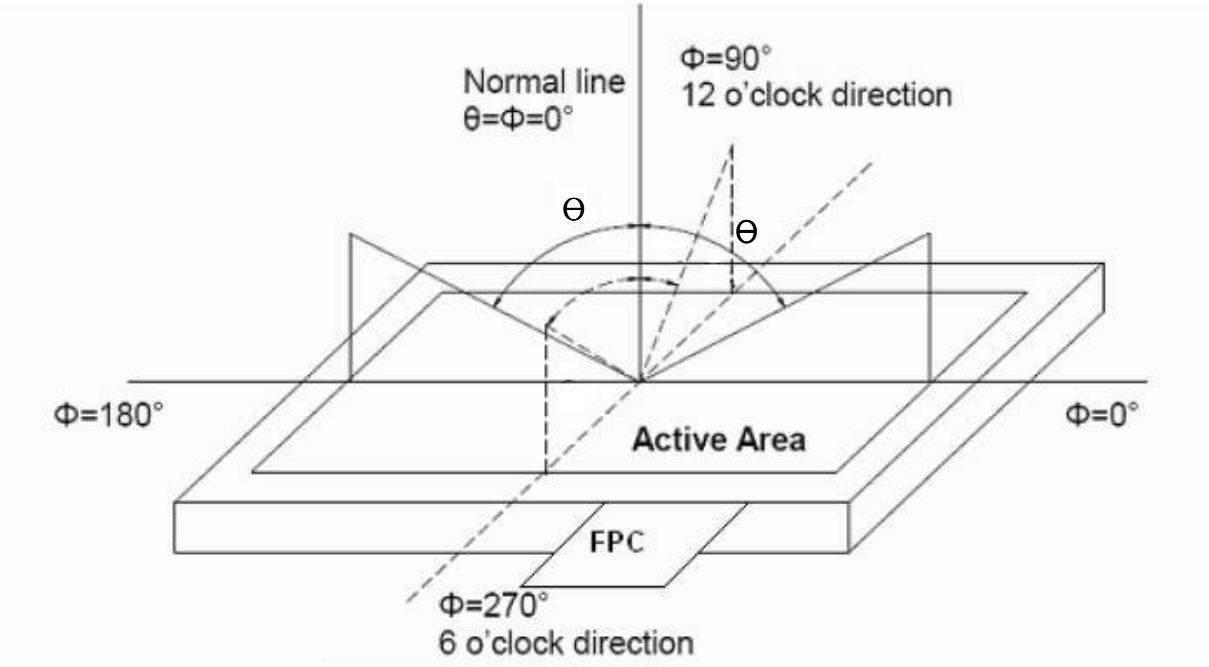
10. Optical Characteristics

10-1) Specification:

Ta=25℃

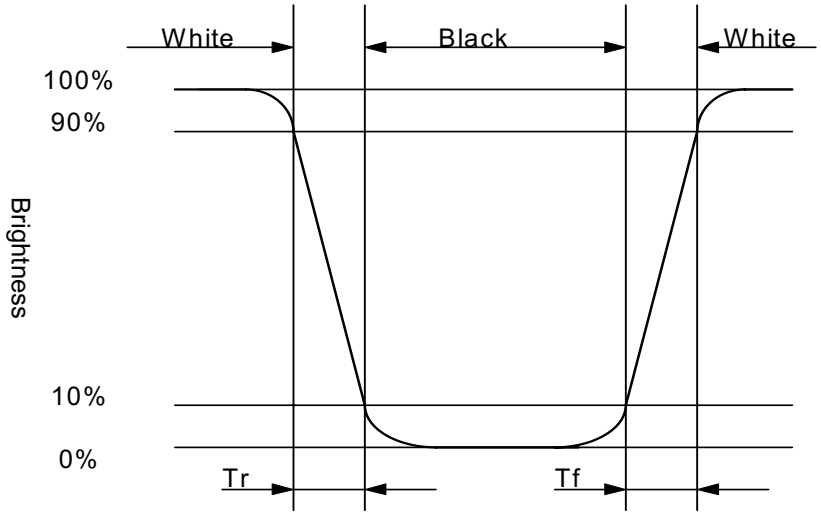
Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	θ	CR≧10	55	65	-	deg	Note 10-1
	Vertical	θ (to 6 o'clock)		55	65	-	deg	
		θ (to 12 o'clock)		35	45	-	deg	
Contrast Ratio		CR	θ=0°	300	400	-	-	Note 10-2
Response time	Rise	Tr	25℃	-	10	15	ms	Note 10-3
	Fall	Tf		-	15	25		
Brightness		L	θ=0°	185	230	-	cd/㎡	Note 10-5
Luminance Uniformity		U	θ=0°	70	80	-	%	Note 10-6
White Chromaticity		x	Backlight is on	0.261	0.311	0.361		Note 10-5 Note 10-4
		y		0.280	0.330	0.380		
Red Chromaticity		x		0.550	0.600	0.650		
		y		0.297	0.347	0.397		
Green Chromaticity		x		0.250	0.300	0.350		
		y		0.517	0.567	0.617		
Blue Chromaticity		x		0.097	0.147	0.197		
		y		0.065	0.115	0.165		
NTSC		(x,y)		-	50	-	%	Note 10-4

Note 10-1：The definitions of viewing angles are as follow



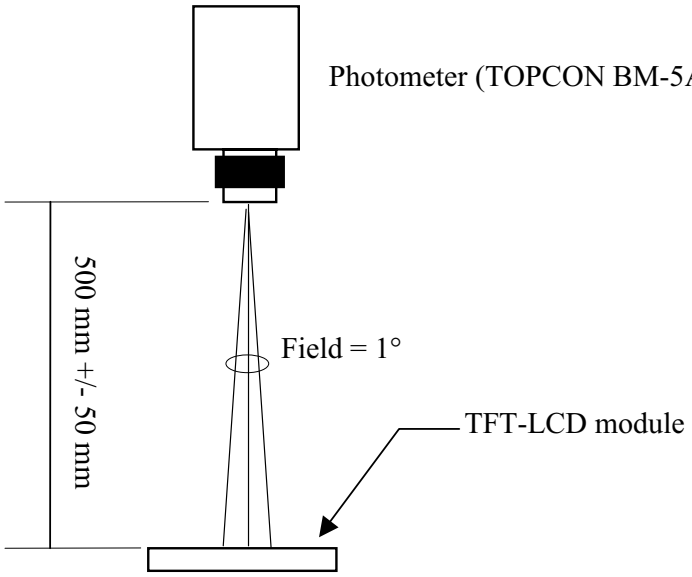
Note 10-2：The definition of contrast ratio $CR = \frac{\text{Luminance at White Pattern}}{\text{Luminance at Black Pattern}}$

Note 10-3：Definition of Response Time T_r and T_f:



Note 10-4：Definition of color chromaticity（CIE1931）
Color coordinates measured at center point of LCD.

Note 10-5：All optical measurements shall be performed after backlight being turned-on for 5 minutes. The optical characteristics shall be measured in dark room. The measuring configuration shows as following figure.



Optical characteristics measuring configuration

Note 10-6：The uniformity of LCD is defined as

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

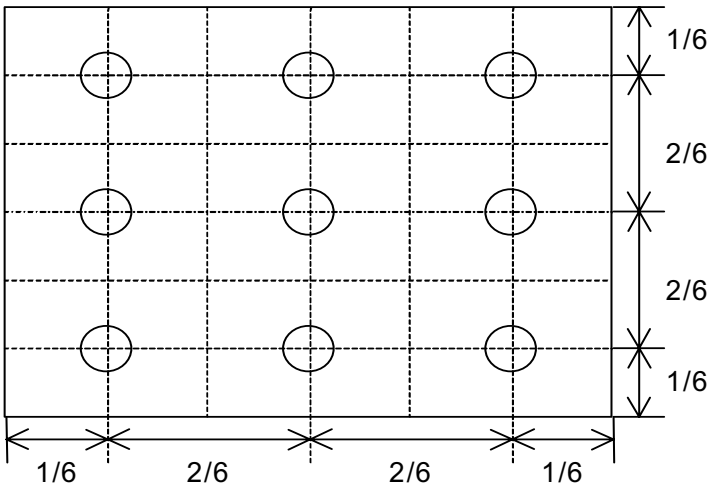
Luminance meter：BM-7 fast (TOPCON)

Measurement distance：500 mm +/- 50 mm

Ambient illumination：dark room

Measuring direction：Perpendicular to the surface of module

The test pattern is white



11. Precautions for use of LCD modules

11-1) Handling Precautions

a. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

b. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

c. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

d. The polarizer covering the display surface of the LCD modules is soft and easily scratched. Handle this polarizer carefully.

e. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents：

－Isopropyl alcohol

－Ethyl alcohol

f. Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following：

－Water

－Ketone

－Aromatic solvents

g. Do not attempt to disassemble the LCD Module.

h. If the logic circuit power is off, do not apply the input signals.

I. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

11-2) Be sure to ground the body when handling the LCD Modules.

11-3) Tools required for assembly, such as soldering irons, must be properly ground.

11-4) To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

11-5) Please following the tear off direction as figure 11-1 to remove the protective film as slowly as possible, so that electrostatic charge can be minimized.

11-6) Storage precautions

a. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

b. The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend conditions is：

Temperature：0℃~40℃ Relatively humidity：≦80%

c. The LCD modules should be stored in the room without acid, alkali and harmful gas.

11-7) Transportation Precautions

a. The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

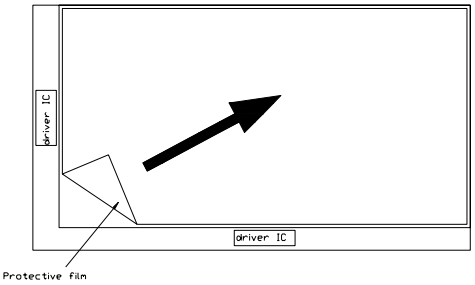


Figure 11-1 the way to peel off protective film

12. Reliability Test

No	Test Item	Test Condition	Remark
1	High Temperature Operation Test	Ta = +70℃, 240 hrs	IEC60068-2-2,GB2423.2－89
2	Low Temperature Operation Test	Ta = -20℃, 240 hrs	IEC60068-2-1,GB2423.1－89
3	High Temperature Storage Test	Ta = +80℃, 240 hrs	IEC60068-2-2,GB2423.2－89
4	Low Temperature Storage Test	Ta = -30℃, 240 hrs	IEC60068-2-1,GB2423.1－89
5	High Temperature & High Humidity Operation Test	Ta = +60℃, 90%RH max, 240 hrs	IEC60068-2-3,GB/T2423.2－2006
6	Thermal Shock (non-operation)	-20℃ 30min ~ +70℃ 30min Change time：5min, 100 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14,GB2423.22－87
7	Electrostatic Discharge Test (operation)	C=150pF，R=330Ω Air = ±15KV Contact = ±8KV 10 times/terminal	IEC61000-4-2 GB/T17626.2－1998
8	Vibration Test (non-operation)	Frequency：10 ~ 55 H_Z Stroke：1.5mm Sweep：10 Hz~55 Hz~10 Hz Test period：2 hours for each direction of X, Y, Z (6 hours for total)	IEC60068-2-6 GB/T2423.10－1995
9	Shock Test (non-operation)	Gravity：80G 6ms Direction: ±X, ±Y, ±Z 3 times for each direction	IEC60068-2-27 GB/T2423.5－1995
10	Package Drop Test	Height：80cm，1 corner 3 edges，6 surfaces	IEC60068-2-32 GB/2423.8－1995
11	Package Vibration Test	Random Vibration： 0.015G*G/Hz for 5-200Hz -6dB/Octave from 200-500Hz 2 hours for each direction of X,Y,Z (6 hours for total)	IEC60068-2-34

Ta：ambient temperature

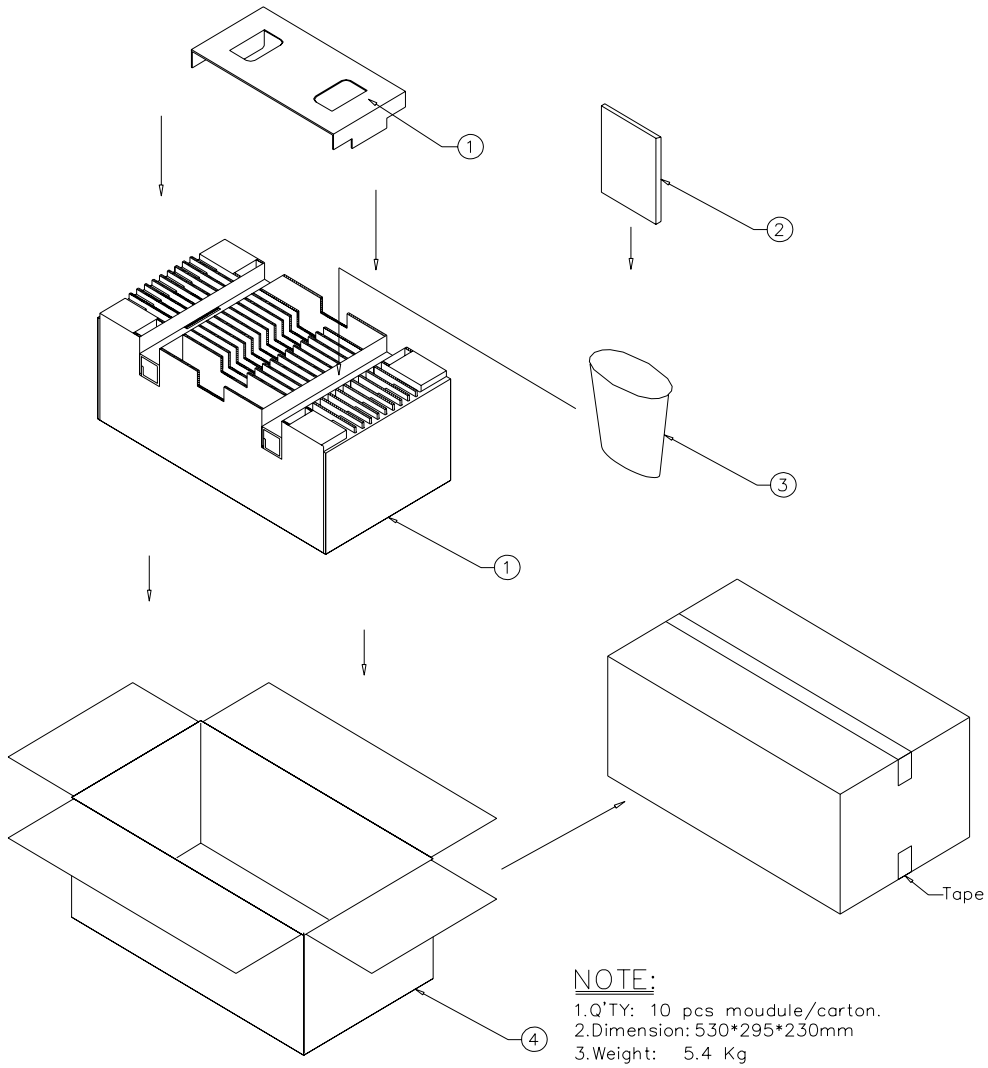
Note：The protective film must be removed before temperature test

[Criteria]

In the standard conditions, there is not display function NG issue occurred. (Including：line defect, no image) All the cosmetic specification is judged before the reliability stress.

13. Packing Diagram

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

ITEM	PART NO.	DESCRIPTION	QTY	REMARK
4	50-0100111	CARTON	1	
3	50-0500291	防靜電氣泡袋 Pink	10	抗靜電
2	PD104SM1		10	
1	50-0302301	10.4"COG瓦楞隔板緩衝材(10u)	1	上蓋+ 底座

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

APPROVE	Frank shin	'08.11.21	SCALE	UNIT	SHEET 1 OF 1	DWG.TITLE: PD104SM1 MODULE PACKING
CHECK	Frank shin	'08.11.21				
DRAWN	Joseph	'08.11.21	MTL.NO.		DWG FILE:	REV. 01 / A4 SIZE