

深圳市友创光显有限公司

产品规格书

Product Type: 6.2" TFT LCD Module

LCD Number: CLAA062LA02CW

MODULE NO. : YC062C050

CUSTOMER	PREPARE BY	CHECK BY	APPROVED BY
APPROVED			
SUPPLIER	PREPARE BY	CHECK BY	APPROVED BY
APPROVED			

Preliminary Specification

Final Specification

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1. General Description

NO.	Item	Specification	Remark
1	LCD size	6.2 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	800 × 3(RGB) × 480	
4	Display mode	Normally White, Transmissive	
5	Dot pitch	0.1719(W) × 0.1609(H) mm	
6	Active area	137.52(W) × 77.232(H) mm	
7	Module size	155.2(W) × 88.2(H) × 5.0(D) mm	Note1
8	Surface treatment	Anti-Glare	
9	Color arrangement	RGB-stripe	
10	Optimum Viewing Direction	6 0' clock	

2. Pin Assignment

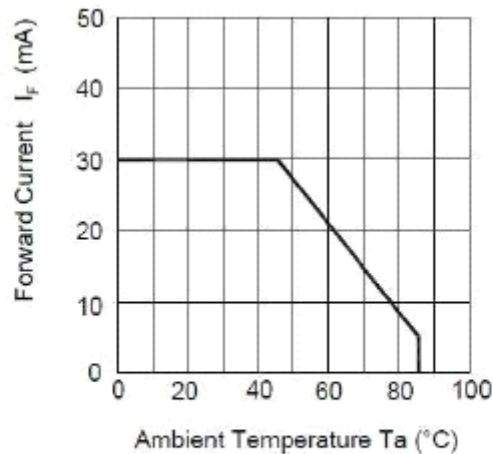
2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Digital Supply Voltage	DVDD	-0.3	+5.0	V	
Analog Supply Voltage	AVDD	-0.5	+15	V	
Gate On Voltage	VDDG	-0.3	+40	V	
Gate Off Voltage	VEEG	-20	+0.3	V	
Gate On-Gate Off Voltage	VDDG-VEEG	-0.3	40	V	
Forward Current (per LED)	I _f	-	30	mA	
Reverse Voltage (per LED)	VR	-	5	V	
Pulse forward current (per LED)	I _{fp}	-	100	mA	1,2
Operation Temperature	T _{op}	-20	70	°C	3
Storage Temperature	T _{stg}	-30	80	°C	3

Note1 : I_{fp} Conditions : Pulse Width ≤ 10msec ; Duty ≤ 1/10

Note2: Each LED operating must under the condition as below drawing.
(Ambient Temperature /Allowable Forward Current)

Forward Current Derating Curve



Note3 : If users use the product out off the environmental operation range (temperature and humidity) , it will have visual quality concerns.

3. ELECTRICAL CHARACTERISTICS

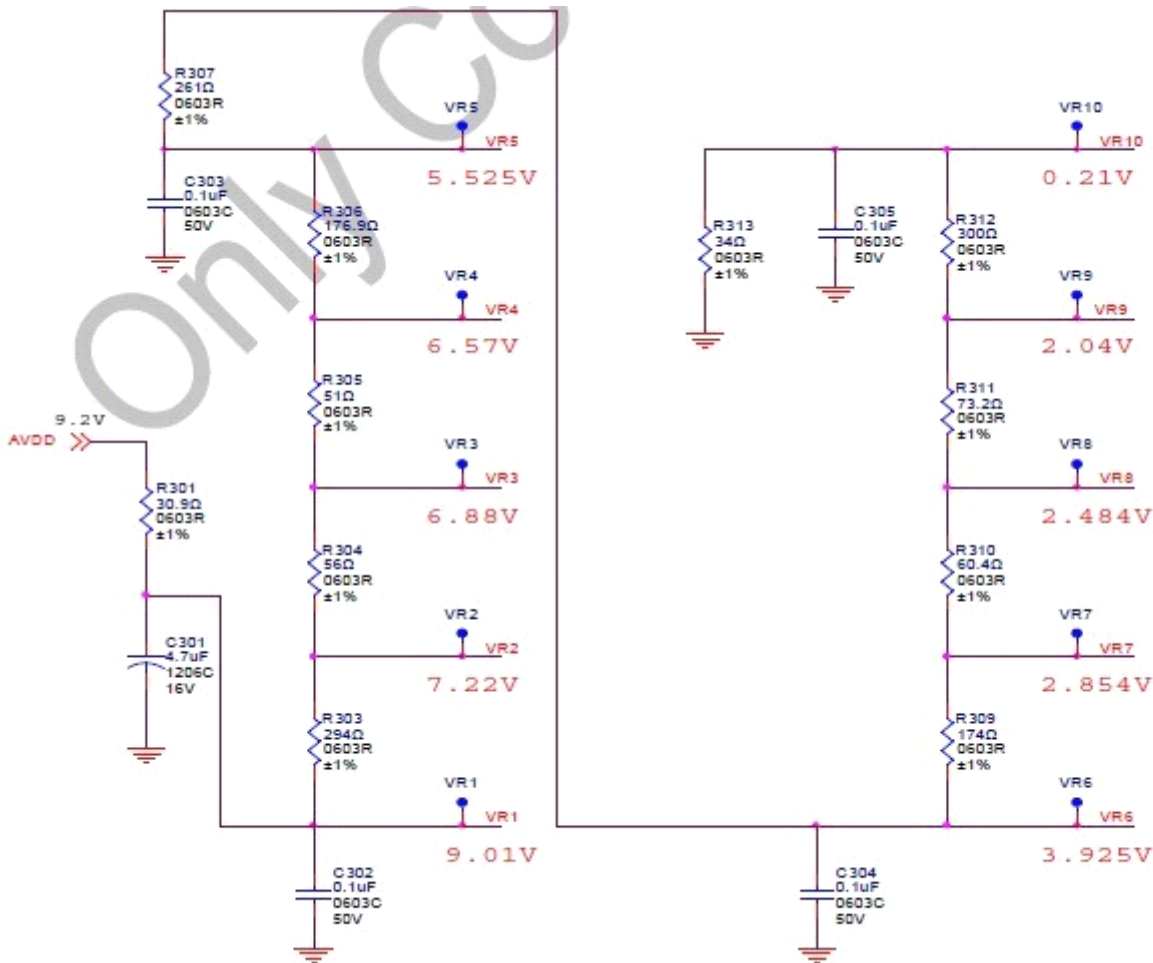
3.1 Typical operation conditions

Ta=25°C

Item	Symbol	Min.	Typ.	Max.	Unit.	Note.
Digital Supply Voltage	DVDD	3	3.3	3.6	V	
Analog Supply Voltage	AVDD	9.0	9.2	9.4	V	
Gate On Voltage	VDDG	17	18	19	V	
Gate Off Voltage	VEEG	-6.6	-6	-5.4	V	
Common Voltage	VCOM	3.8	(4)	4.2	V	1
Gamma Voltage	VR 1	-	(9.01)	-	V	2
	VR 2	-	(7.22)	-	V	2
	VR 3	-	(6.88)	-	V	2
	VR 4	-	(6.57)	-	V	2
	VR 5	-	(5.525)	-	V	2
	VR 6	-	(3.925)	-	V	2
	VR 7	-	(2.854)	-	V	2
	VR 8	-	(2.484)	-	V	2
	VR 9	-	(2.04)	-	V	2
	VR 10	-	(0.21)	-	V	2
Logic Input Voltage	VIH	0.7DVDD	-	DVDD	V	
	VIL	GND	-	0.3DVDD	V	

Note1 : Please adjust VCOM to make the flicker level be minimum.

Note2 : Gamma circuit for reference only



3.2 Current consumption

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note.
Gate on Current	IVDDG	VDDG = 18 V	-	0.5	1	mA	1
Gate off Current	IVEEG	VEEG = -6 V	-	0.5	1	mA	1
Digital Current	IDVDD	DVDD = 3.3V	-	10	15	mA	1
Analog Current	IAVDD	AVDD = 9.2 V	-	30	35	mA	1
Total Power Consumption	PC		-	321	396	mW	1

Note1: Typ. specification : Gray-level test Pattern

Max. specification : Black test Pattern



(a) Gray-level Pattern

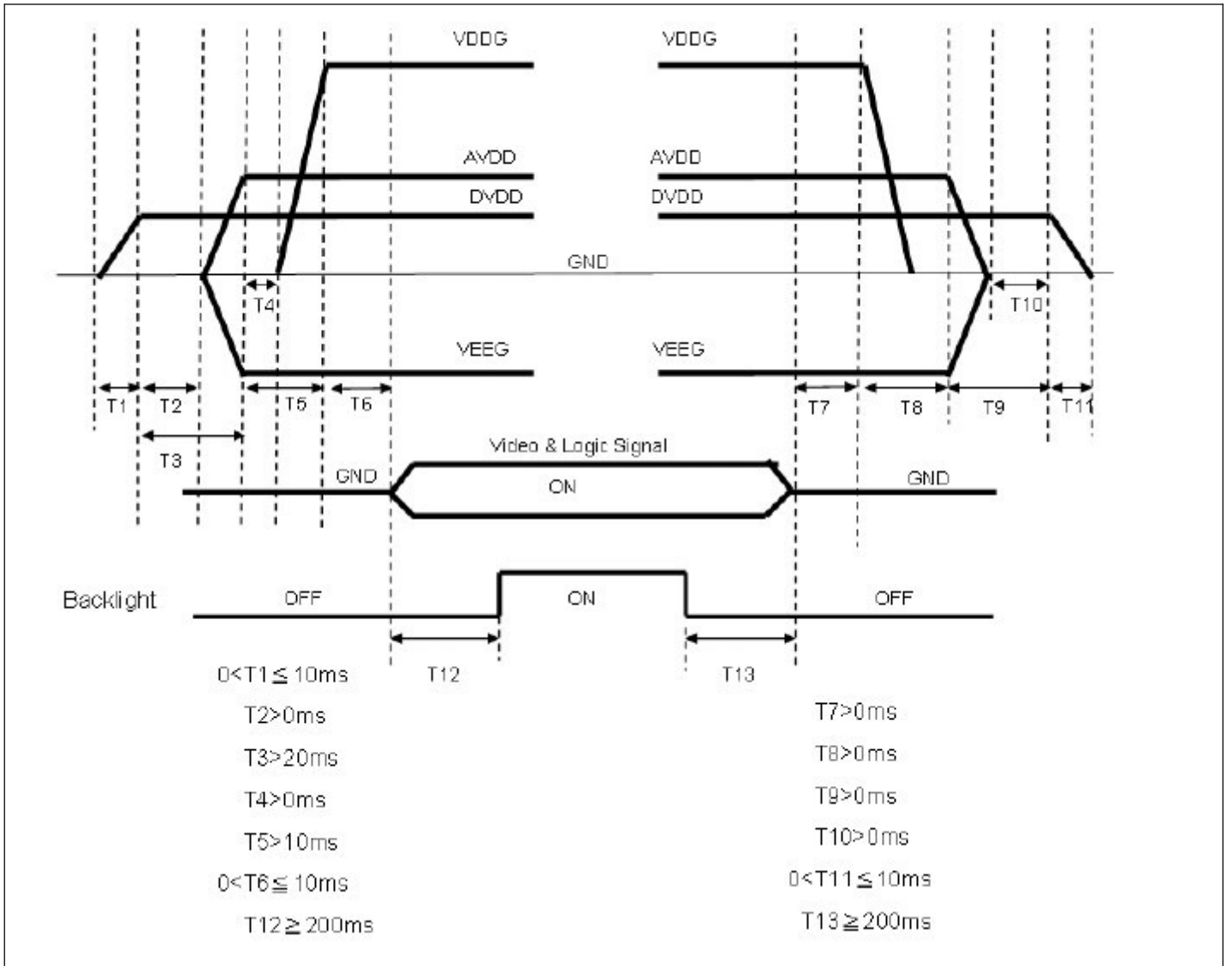


(b) Black Pattern

3.3 Power 、 Signal sequence

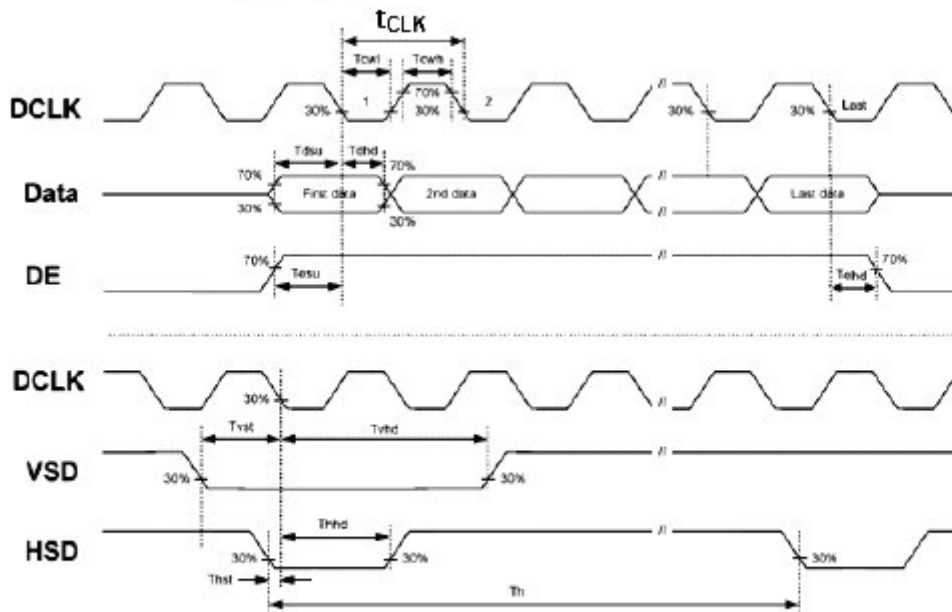
Power On : DVDD → AVDD/VEEG → VDDG → Video & Logic Signal → Backlight

Power Off : Backlight → Video & Logic Signal → VDDG → AVDD/VEEG → DVDD



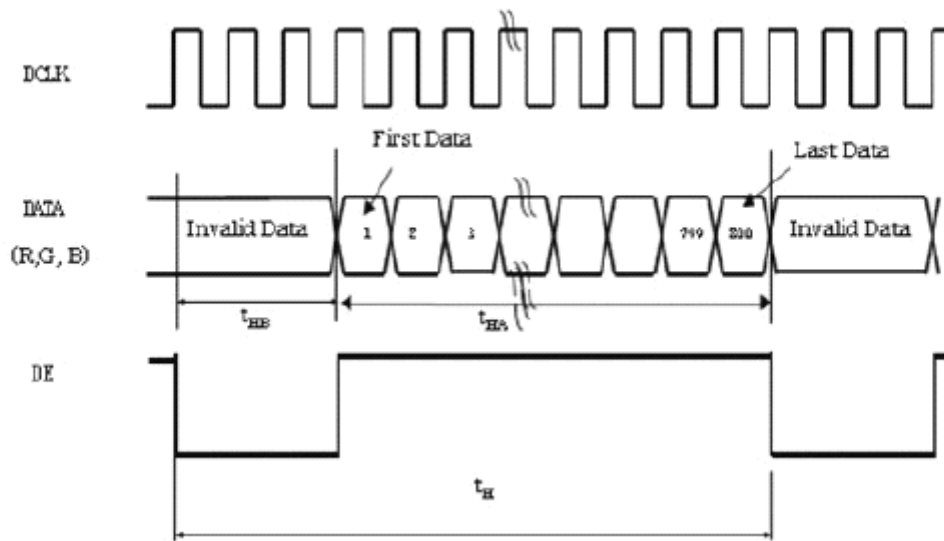
3.4 Timing characteristics of input signals

	ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Note
DCLK	Dot Clock	$1/t_{CLK}$	26	30	35	MHz	
	DCLK pulse duty	T_{cwh}	40	50	60	%	
DE	Setup Time	T_{esu}	8	-	-	ns	
	Hold time	T_{ehd}	8	-	-	ns	
	Horizontal Period	t_H	908	928	1000	t_{CLK}	
	Horizontal Valid	t_{HA}	800				
	Horizontal Blank	t_{HB}	108	128	200	t_{CLK}	
	Vertical Period	t_V	515	525	700	t_H	
	Vertical Valid	t_{VA}	480				
	Vertical Blank	t_{VB}	35	45	220	t_H	
SYNC	HSYNC Setup Time	T_{hst}	8	-	-	ns	
	HSYNC Hold Time	T_{hhd}	8	-	-	ns	
	VSYSN Setup Time	T_{vst}	8	-	-	ns	
	VSYSN Hold Time	T_{vhd}	8	-	-	ns	
	Horizontal Period	t_H	908	928	1000	t_{CLK}	
	Horizontal Pulse Width	t_{HPW}	-	48	-	t_{CLK}	$t_{hb} + t_{HPW} = 88DCLK$ is fixed
	Horizontal Back Porch	t_{hb}	-	40	-	t_{CLK}	
	Horizontal Front Porch	t_{HFP}	20	40	112	t_{CLK}	
	Horizontal Valid	t_{HD}	800				
	Vertical Period	t_V	515	525	700	t_H	
	Vertical Pulse Width	t_{VPW}	-	3	-	t_H	$t_{VPW} + t_{vb} = 32t_H$ is fixed
	Vertical Back Porch	t_{vb}	-	29	-	t_H	
	Vertical Front Porch	t_{VFP}	3	13	188	t_H	
Vertical Valid	t_{VD}	480					
DATA	Setup Time	T_{dsu}	8	-	-	ns	
	Hold Time	T_{dhd}	8	-	-	ns	

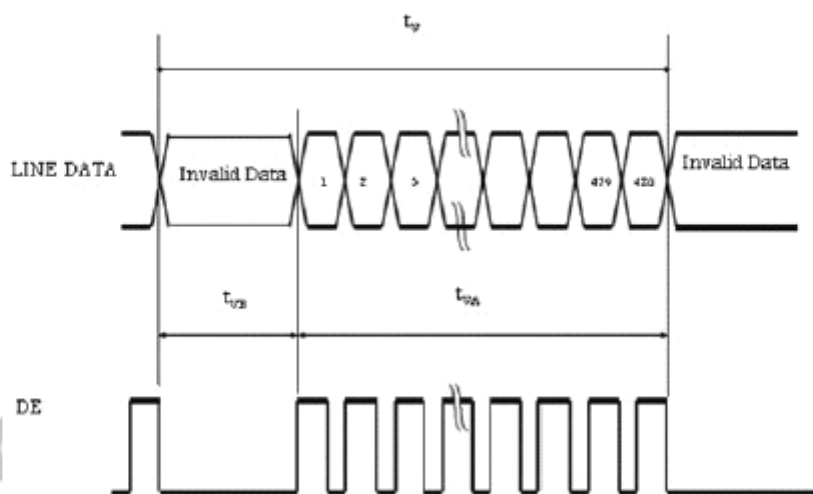


DE mode

Horizontal timing :

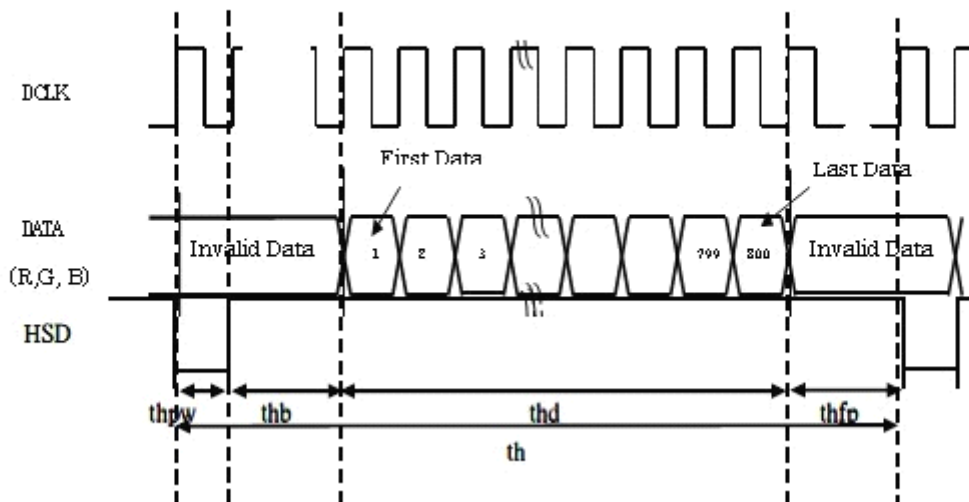


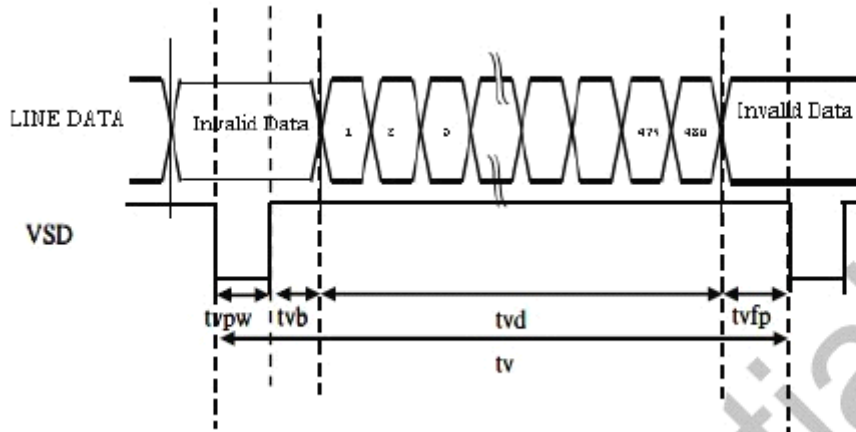
Vertical timing :



SYNC mode

Horizontal timing :





3. Operation Specifications

3.1. Absolute Maximum Rating

3.1.2. Current Consumption

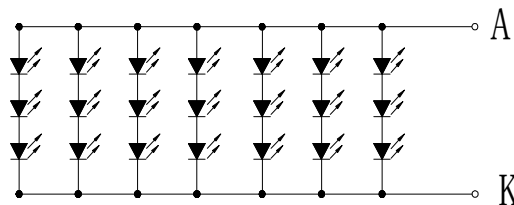
2.1.1 TFT LCD Module

Item	Symbol	Min.	Max.	Unit	Note
Power supply voltage	V _{CC}	-0.3	5.0	V	GND=0
	AV _{DD}	-0.5	15	V	AGND=0
	V _{COM}	0	6	V	
Logic Signal Input Level	V _I	-0.3	V _{CC} +0.3	V	

3.1.3 Back-light Unit:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
LED Current	IF	-	140	-	mA	-	-
LED Voltage (Total)	VF	9	9.9	10.5	V	-	-
Life Time		-	25000	-	Hr.	I ≤ 140mA	-
Color	White						

LED Circuit Diagram:



Note1:A:Anode(+) K:Cathode(-)

Note2:LED control must use the constant current control to avoid the leakage light and brightness quality issue.

Note3:Definition of the LED life time:Luminance will decay less than50%.

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Pin NO.	SYMBOL	DESCRIPTION
1	AGND	Analog Ground
2	AVDD	Analog Power
3	DVDD	Digital Power
4	R0	Data Input(LSB)
5	R1	Data Input
6	R2	Data Input
7	R3	Data Input
8	R4	Data Input
9	R5	Data Input
10	R6	Data Input
11	R7	Data Input(MSB)
12	G0	Data Input(LSB)
13	G1	Data Input
14	G2	Data Input
15	G3	Data Input
16	G4	Data Input
17	G5	Data Input
18	G6	Data Input
19	G7	Data Input(MSB)
20	B0	Data Input(LSB)
21	B1	Data Input
22	B2	Data Input
23	B3	Data Input
24	B4	Data Input
25	B5	Data Input
26	B6	Data Input
27	B7	Data Input(MSB)
28	DCLK	Clock input
29	DE	Data Enable signal
30	HSD	Horizontal sync input. Negative polarity
31	VSD	Vertical sync input. Negative polarity
32	MODE	DE/SYNC mode select. Normally pull high H: DE mode. L: HSD/VSD mode
33	RSTB	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=47K Ω , C=1 μ)
34	STBYB	Standby mode, normally pull high STBYB="1", normal operation STBYB="0", timing control. source driver will turn off, all output are high-Z
35	SHLR	Left or Right Display Control
36	DVDD	Digital Power

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37	UPDN	Up / Down Display Control
38	GND	Digital Ground
39	AGND	Analog Ground
40	AVDD	Analog Power
41	VCOM	Common Voltage
42	DITH	Dithering setting DITH="H" 6bit resolution(last 2 bit of input data truncated) (default setting) DITH="L" 8bit resolution
43	NC	Not connect
44	NC	Not connect
45	V10	Gamma correction voltage reference
46	V9	Gamma correction voltage reference
47	V8	Gamma correction voltage reference
48	V7	Gamma correction voltage reference
49	V6	Gamma correction voltage reference
50	V5	Gamma correction voltage reference

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51	V4	Gamma correction voltage reference
52	V3	Gamma correction voltage reference
53	V2	Gamma correction voltage reference
54	V1	Gamma correction voltage reference
55	NC	Not connect
56	VDDG	Positive Power for TFT
57	DVDD	Digital Power
58	VEEG	Negative Power for TFT
59	GND	Digital Ground
60	NC	Not connect

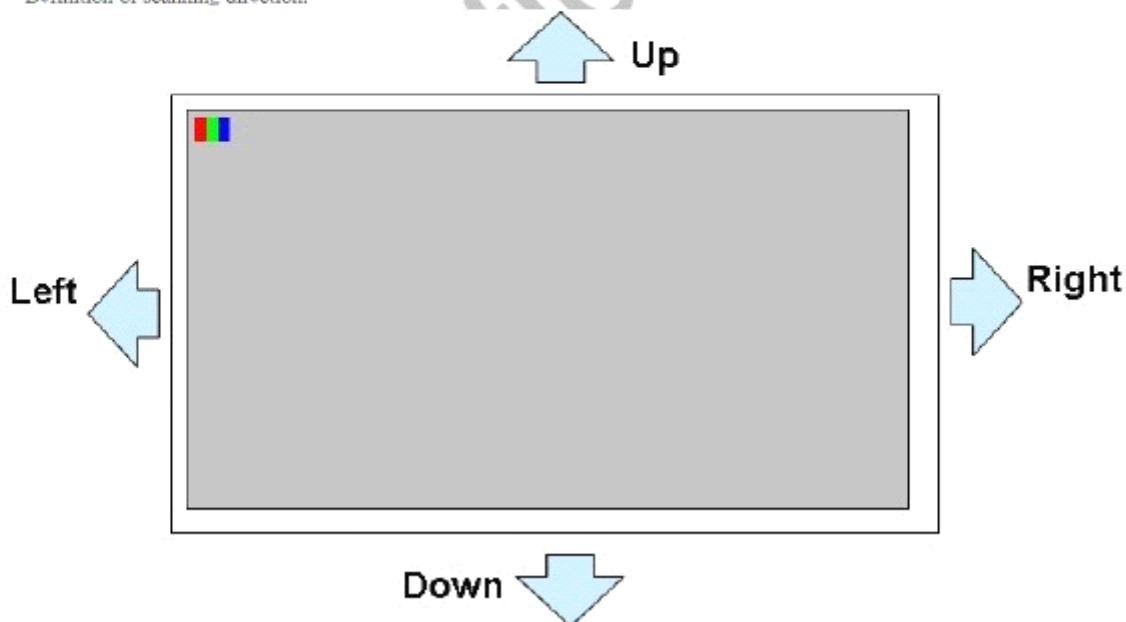
【Note1】 Mating connector : HIROSE, FH28-60S-0.5SH, 60pin,pitch = 0.5mm

【Note2】 SHLR : left or right setting

UPDN : up or down setting

SHLR	UPDN	Data shifting
DVDD	GND	Left→Right · Up→Down(default)
GND	GND	Right→Left · Up→Down
DVDD	DVDD	Left→Right · Down→Up
GND	DVDD	Right→Left · Down→Up

Definition of scanning direction.



4. Optical Characteristics

Item	Symbol	Conditions	Specifications			Unit	Note
			Min.	Typ.	Max.		
Contrast Ratio	CR	Normal $\theta = \Phi = 0^\circ$	600	700	--	--	(2), (4), (6)
Response time	Ton		--	6	12	ms	(3)
	Toff		--	14	28	ms	(3)
Color chromaticity	Wx		0.28	0.30	0.33	--	
	Wy	0.29	0.31	0.34	--		
Viewing angle (CR ≥ 10)	θL	$\Phi = 180^\circ$ (9 o' clock)	65	75	--	degree	(1)
	θR	$\Phi = 0^\circ$ (3 o' clock)	65	75	--		
	θT	$\Phi = 90^\circ$ (12 o' clock)	50	60	--		
	θB	$\Phi = 270^\circ$ (6 o' clock)	65	75	--		
Uniformity	--	--	70	--	--	%	(7)
LCM luminance	YL	I=140mA	400	450		cd/m ²	9 point AVG

Note:

4-1 Measuring Condition

■ Measuring surrounding : dark room

■ Ambient temperature : 25±2°C

■ The measured value of luminance and color coordinate bases BM-7

4-2 Measuring Equipment

- TOPCON BM-7
- Measuring spot size : field 2°

(1) Definition of viewing angle range

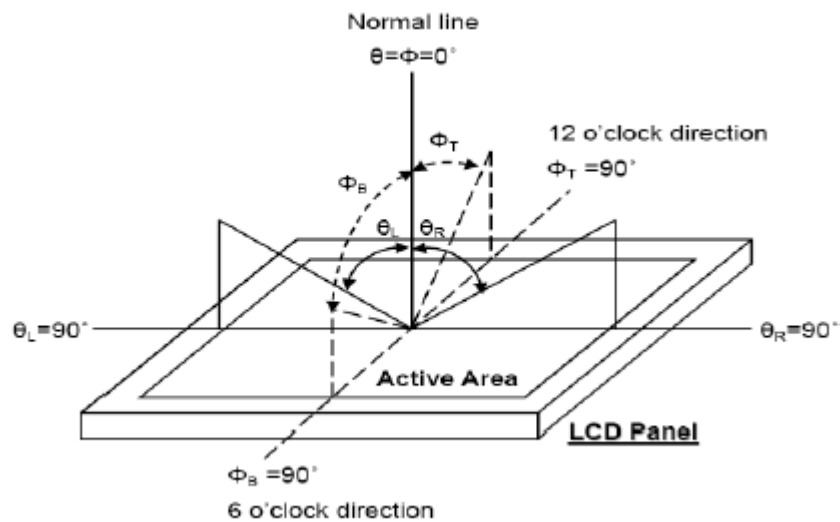


Fig. 4-3 Definition of viewing angle

(2) Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 luminance meter 1.0° field of view at a

distance of 50cm and normal direction.

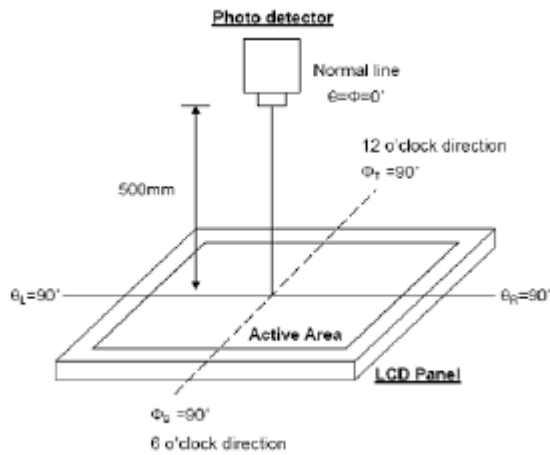


Fig. 4-4 Optical measurement system setup

(3) Definition of Response time:

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time, T_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , is the time between photo detector output intensity changed from 10% to 90%.

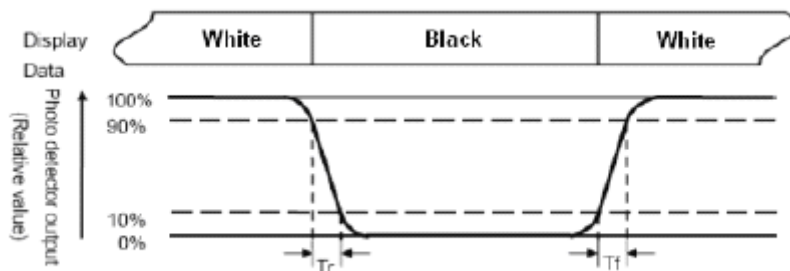


Fig. 8.3 Definition of response time

(4) Definition of contrast ratio:

The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

(5) Definition of color chromaticity (CIE 1931)

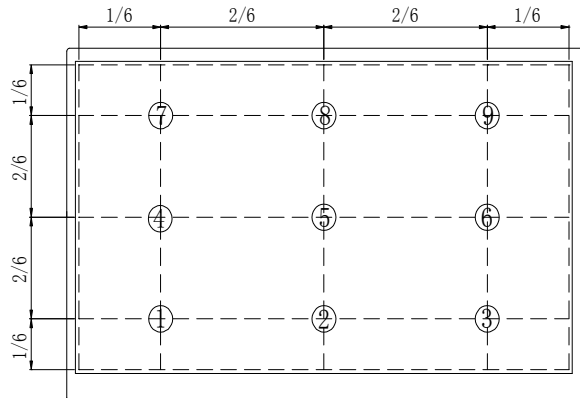
Color coordinates measured at the center point of LCD

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(6) Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

$$(7) \text{ Uniformity (U)} = \frac{\text{Brightness (min)}}{\text{Brightness (max)}} \times 100\%$$

Fig. 4-5 Definition of brightness uniformity



5. Quality Assurance

No.	Test Items	Test Condition	Note
1	High Temperature Storage Test	Ta=60_ Dry 96h	
2	Low Temperature Storage Test	Ta=-20_ Dry 96h	
3	High Temperature Operation Test	Ta=50_ Dry 96h	
4	Low Temperature Operation Test	Ta=-10_ Dry 96h	
5	High Temperature and High Humidity Operation Test	Ta=50_ 90%RH 96h	
6	Electro Static Discharge Test	Panel surface / FPC input Contact / Air_±200V machine mode_150pF_330Ω	Non-operating
7	Thermal Shock Test	-30_(0.5Hr) ~ +80_(0.5Hr) for 100 cycles	

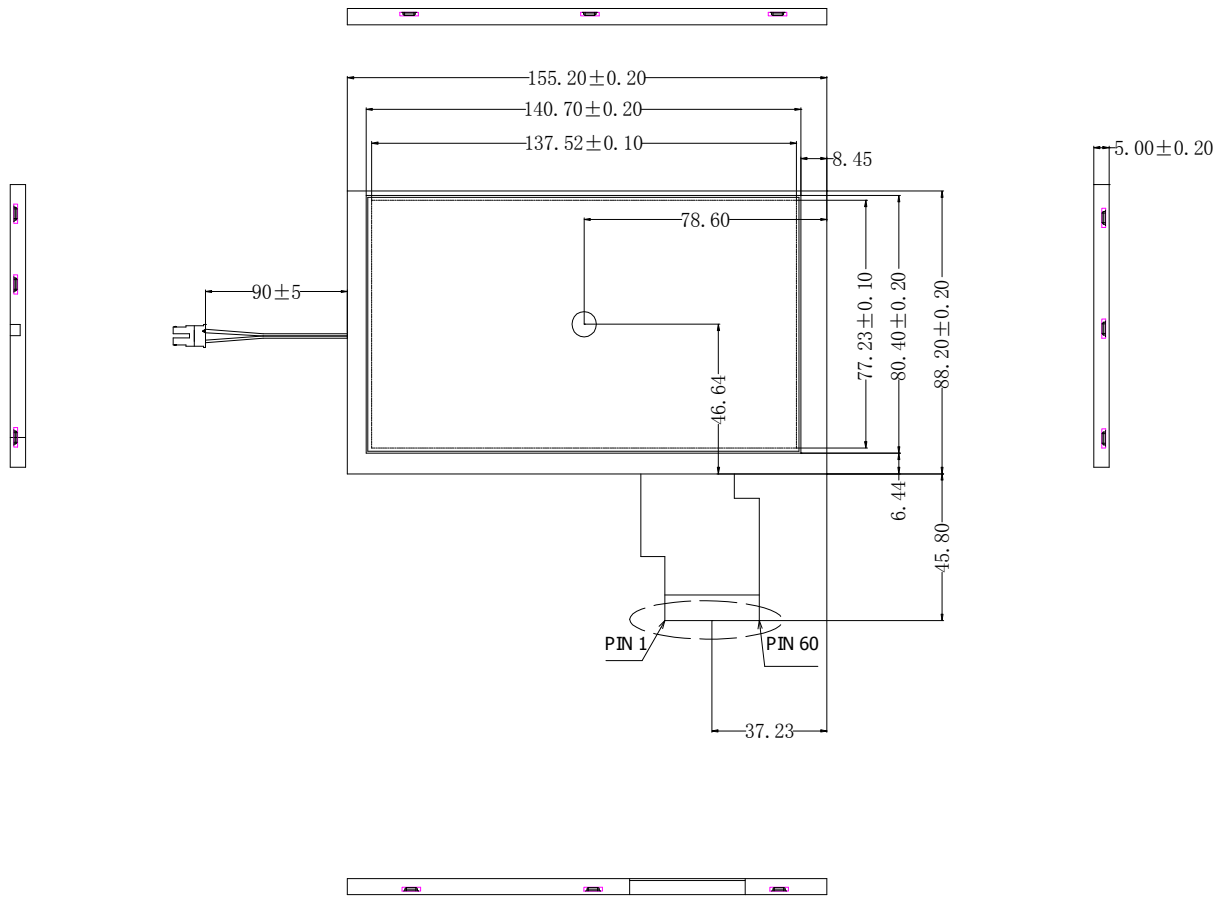
Note:

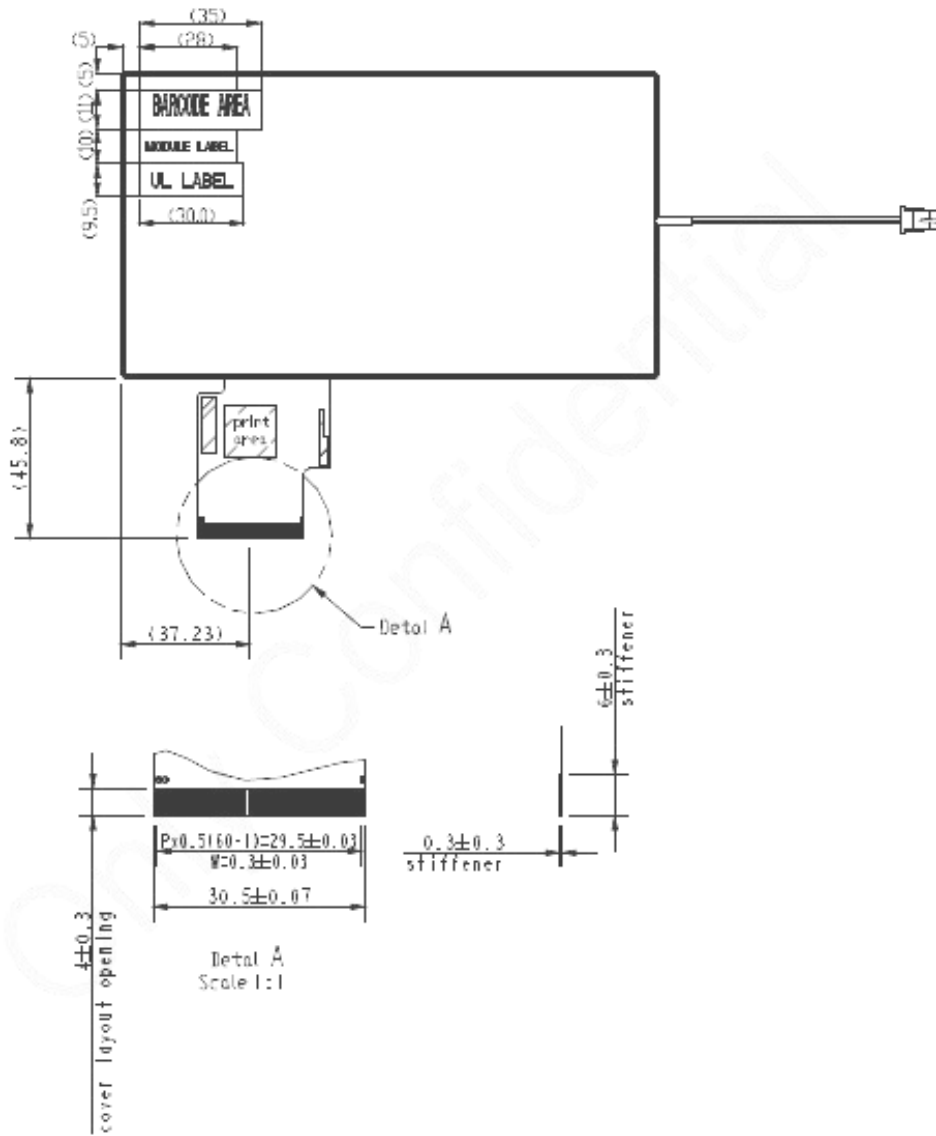
(1) The test samples have recovery time for 4 hours at room temperature before the function check. In the standard conditions, there is no display function NG issue occurred.

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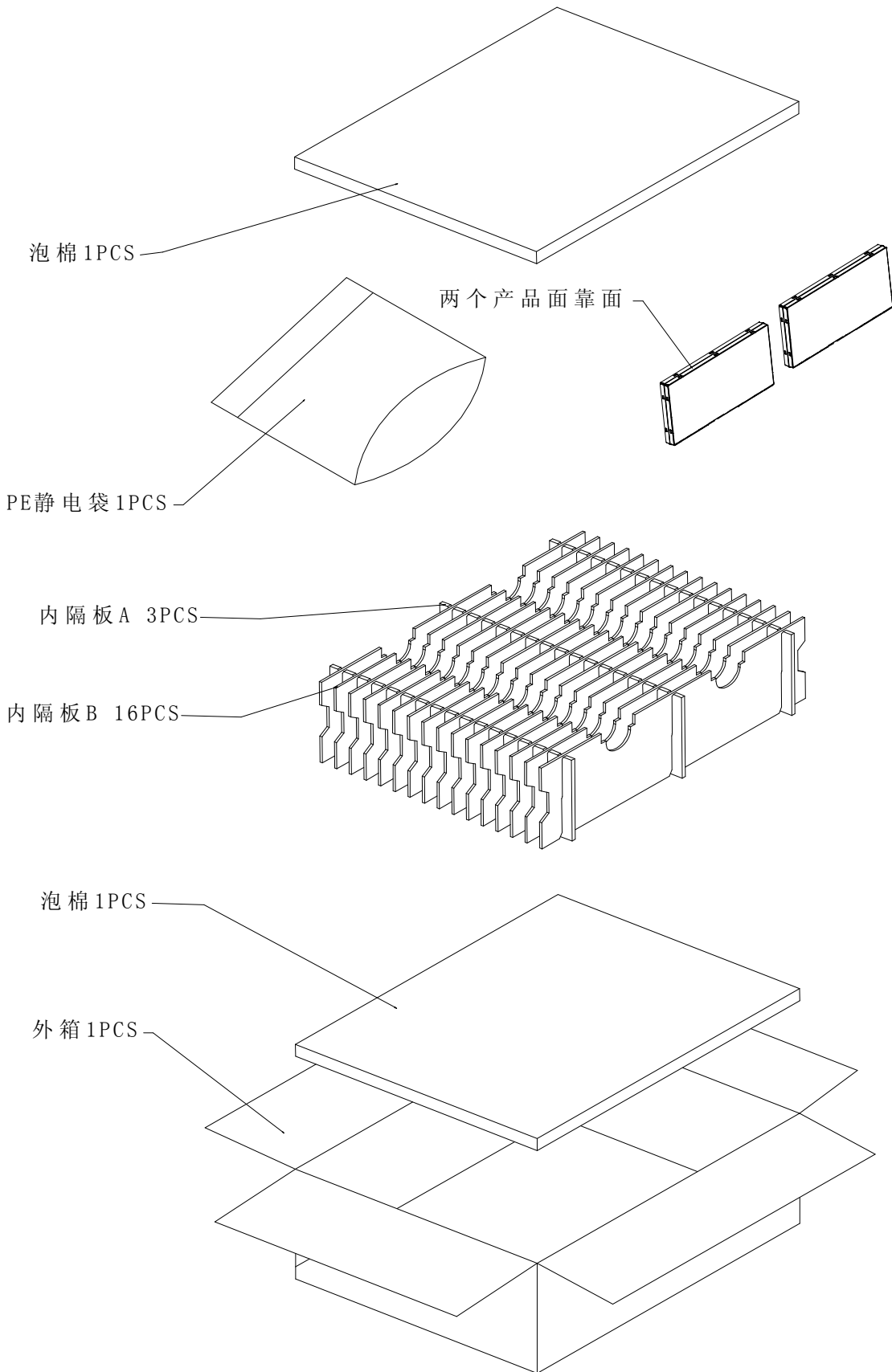
(2) All the cosmetic specifications are judged before the reliability stress.

6. Outline dimension





7.0 Packing form



8. General Precautions

8.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

8.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

8.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

8.4. Storage

1. Store the module in a dark room where must keep at $25\pm 10^{\circ}\text{C}$ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

8.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

