SAT 视安通 SAT ELECTRONIC CO.LTD

SPECIFICATION

Customer: _____

Model Name: SAT070CP40H18Y0-261001

SPEC NO.: _____

Date: _____

Version: _____

■Preliminary Specification

□Final Specification

Approved by	Comment

Approved by	Reviewed by	Prepared by
视安通 2014.05.19 吴金荣		

Record of Revision

Version	Revise Date	Page	Content
Pre-spec.A	2014/05/19		Initial Release

Contents

1. General Specifications

No.	Item	Specification	Remark
1	LCD size	7.0 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	1024× 3(RGB) ×600	
4	Display mode	Normally White, Transmissive	
5	Pixel pitch	0.1506(H) X 0.1790(V) mm	
6	Active area	154.2144(H) X 3(RGB) X 35.92(V) mm	
7	Outline dimensions	164(H) X 100(V) X 2.6(D) mm	
8	Surface treatment	Anti-Glare	
9	Color arrangement	RGB-stripe	
10	Interface	LVDS	
11	Backlight Power consumption	TBD	
12	Panel Power consumption	TBD	
13	Weight	TBD	

2. Pin Assignment

FH19SC-40S-0.5SH (05)

Pin No.	Symbol	Type	Function
1	VCOM	P	Common voltage
2	VDD	P	Digital power
3	VDD	P	Digital power
4	NC	-	Not connect
5	RESET	I	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability.Normally pull high. (R=10KΩ，C=0.1μF)
6	STBYB	I	Standby mode, normally pull high STBYB="1", normal operation STBYB="0",timing control, source driver will turn off, all output are high-Z
7	GND	P	Ground
8	RXIN0-	I	Negative LVDS differential data inputs
9	RXIN0+	I	Positive LVDS differential data inputs
10	GND	P	Ground
11	RXIN1-	I	Negative LVDS differential data inputs
12	RXIN1+	I	Positive LVDS differential data inputs
13	GND	P	Ground
14	RXIN2-	I	Negative LVDS differential data inputs
15	RXIN2+	I	Positive LVDS differential data inputs
16	GND	P	Ground
17	RXCLKIN-	I	Negative LVDS differential clock inputs
18	RXCLKIN+	I	Positive LVDS differential clock inputs
19	GND	P	Ground
20	RXIN3-	I	Negative LVDS differential data inputs
21	RXIN3+	I	Positive LVDS differential data inputs
22	GND	P	Ground
23	NC	-	Not connect
24	NC	-	Not connect
25	GND	P	Ground
26	NC	-	Not connect
27	DIMO	O	Backlight CABC controller signal output
28	SELB	I	6bit/8bit mode select H : 6bit / L : 8bit
29	AVDD	P	Power for Analog Circuit

30	GND	P	Ground
31	LED-	P	LED Cathode
32	LED-	P	LED Cathode
33	L/R	I	Horizontal inversion
34	U/D	I	Vertical inversion
35	VGL	P	Negative power for TFT
36	GND	P	GND
37	GND	P	GND
38	VGH	P	Positive power for TFT
39	LED+	P	LED Anode
40	LED+	P	LED Anode

I：input , O：output , P：Power

【Note】

*1)：When L/R="0" , set right to left scan dirction

When L/R="1" , set left to right scan dirction

When U/D="0" , set top to bottom scan dirction

When U/D="1" , set bottom to top scan dirction

3. Operation Specifications

3.1. Absolute Maximum Ratings

(Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	DV_{DD}	-0.3	3.96	V	
	AV_{DD}	-0.5	14.85	V	
	V_{GH}	-0.3	40.0	V	
	V_{GL}	-20.0	0.3	V	
	V_{GH}-V_{GL}	12	40.0	V	
Operation Temperature	T_{OP}	-20	70	℃	
Storage Temperature	T_{ST}	-30	80	℃	

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

3.1.1. Typical Operation Conditions

(Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DV_{DD}	3.0	3.3	3.6	V	Note 2
	AV_{DD}	9.4	9.6	9.8	V	
	V_{GH}	17	18	19	V	
	V_{GL}	-6.6	-6.0	-5.4	V	
Input signal voltage	V_{COM}	3.4	3.9	4.4	V	
Input logic high voltage	V_{IH}	0.7 DV_{DD}	-	DV_{DD}	V	Note 3
Input logic low voltage	V_{IL}	0	-	0.3 DV_{DD}	V	

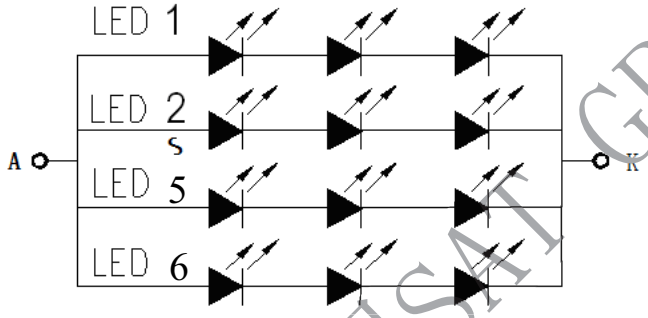
Note 1: Be sure to apply DV_{DD} and V_{GL} to the LCD first, and then apply V_{GH}.
Note 2: DV_{DD} setting should match the signals output voltage (refer to Note 3) of customer's system board.
Note 3: DCLK,HS,VS,RESET,U/D, L/R,DE,R0~R7,G0~G7,B0~B7,MODE,DITHB.

3.1.2. Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I_{GH}	-	0.2	1.0	mA	V_{GH} =18.0V
	I_{GL}	-	0.2	1.0	mA	V_{GL} = -6.0V
	IDV_{DD}	-	4.0	10	mA	DV_{DD} =3.3V
	IAV_{DD}	-	20	50	mA	AV_{DD} =9.6V

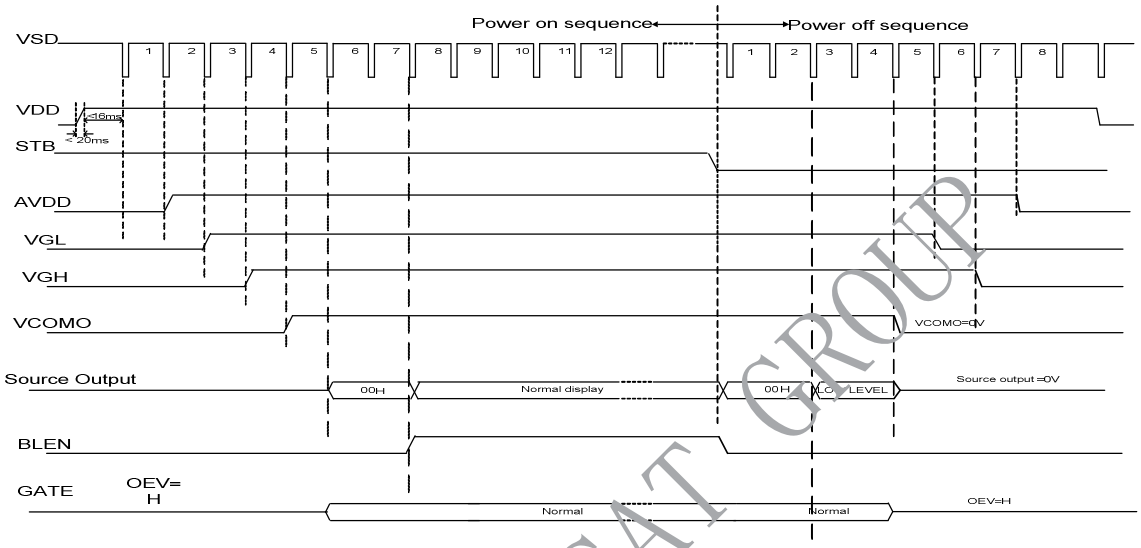
3.1.3. Backlight Driving Conditions (18 White Chips)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply voltage of white LED backlight	VL	8.7	9.6	10.5	V	Note 1
CurrentforLEDbacklight	IL	90	120	150	mA	
Luminance (on the module surface,BM-7)		60	110	-	cd/m^2	
LED life time	-	20,000	-	-	Hr	Note 2

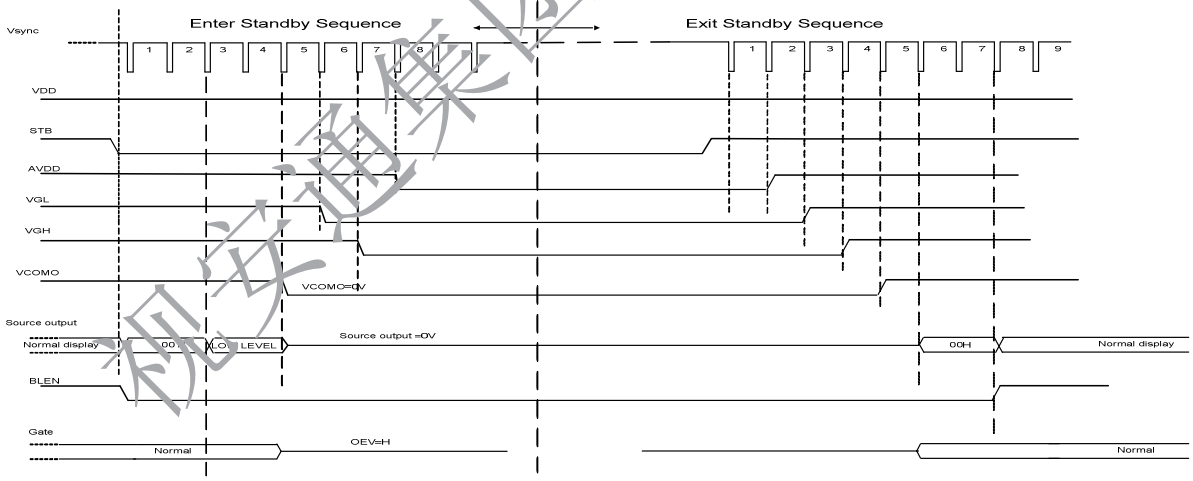


3.2. Power Sequence

In order to prevent IC from power on reset fail, the rising time (TPOR) of the digital power supply VDD should be maintained within the given specifications. Refer to “AC Characteristics” for more detail on timing.



Power On/Off timing chart



Enter and Exit Standby Mode timing chart

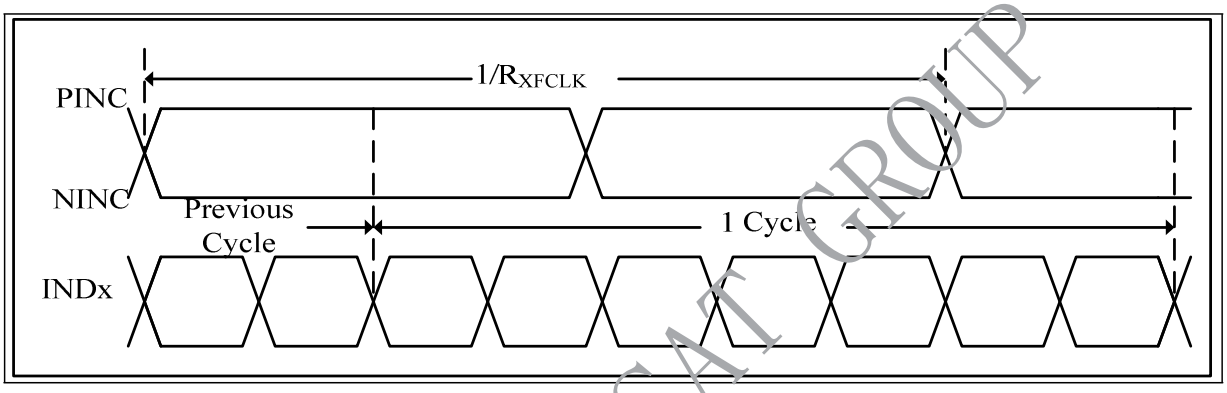
Note: Low level=3Fh,when NBW=L(Normally white)
Low level=00h,when NBW=H(Normally black)

3.3. Timing Characteristics

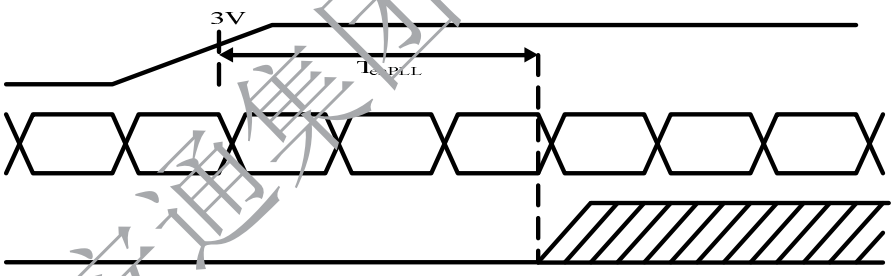
3.3.1. AC Electrical Characteristics

LVDS mode

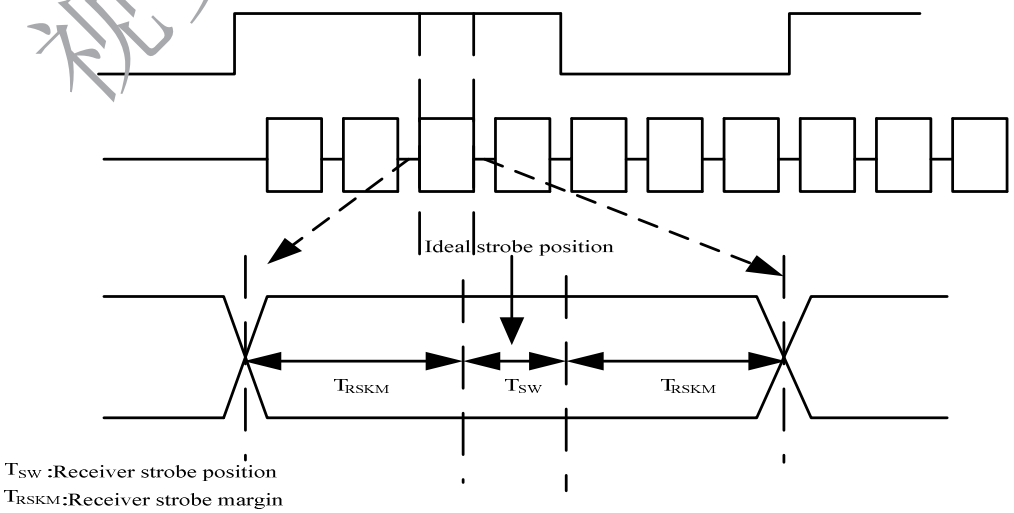
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Clock Frequency	RxFCLK		20	-	71	MHz
Input data skew margin	TRSKM	|VID|=400mV RxVCM=1.2V RxFCLK=71MHz	500			ps
Clock High Time	TLVCH			4/(7* RxFCLK)		ns ns
Clock Low Time	TLVCL			3/(7* RxFCLK)		ns
PLL wake-up-time	TenPLL				150	us



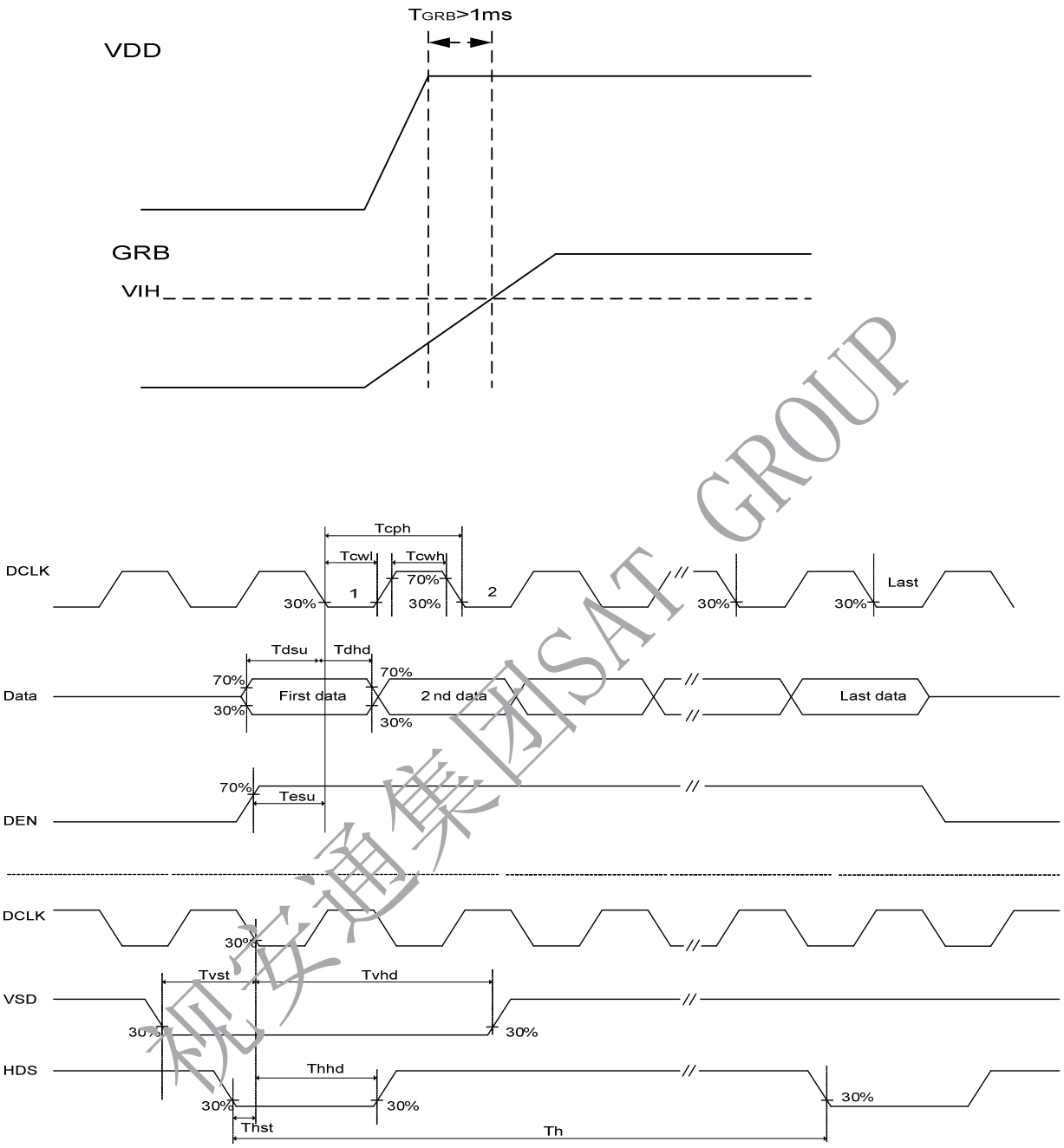
LVDS timing(1)



LVDS timing(2)



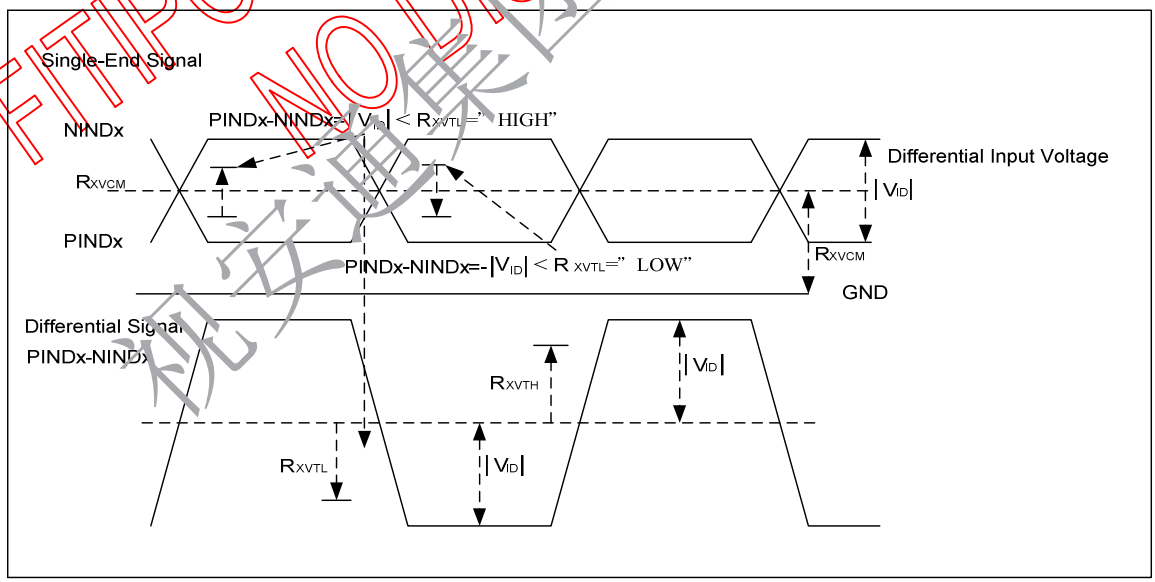
LVDS timing(3)



Parallel Input Clock and Data timing

3.3.2 LVDS DC characteristic

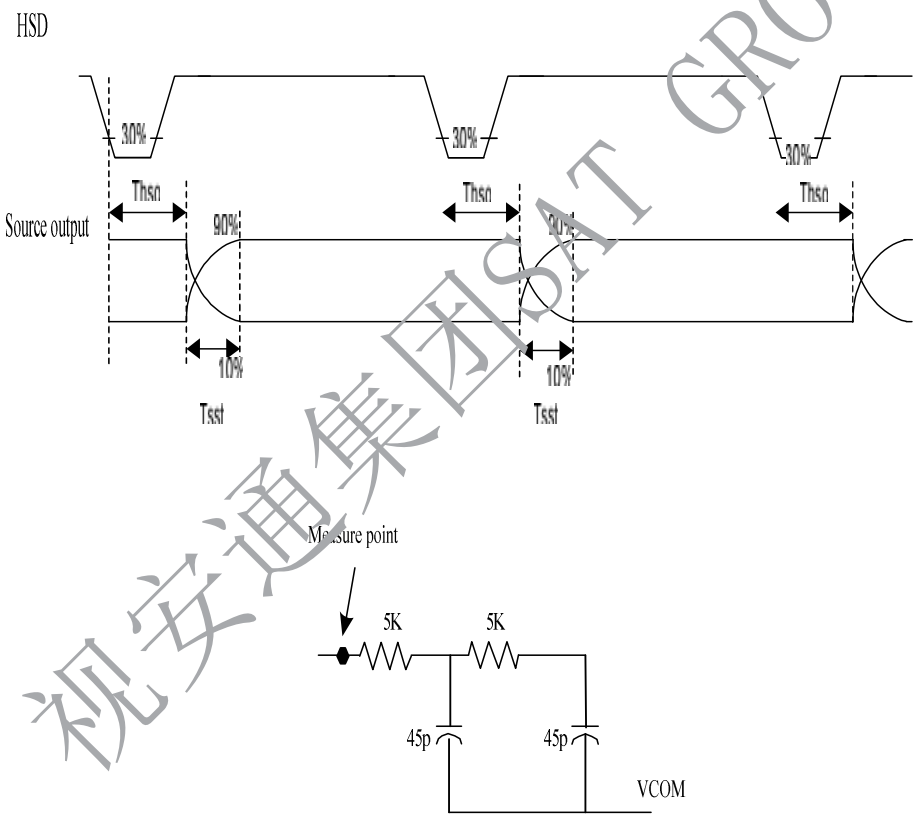
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	RxVTH			+0.1V	V	RxVCM=1.2V
Differential input low threshold voltage	RxVTL	-0.1			V	
Input voltage range(single-end)	RxVIN	0		2.4	V	
Differential input common mode voltage	RxVCM	$\|V_{ID}\|/2$		2.4 -$\|V_{ID}\|/2$	V	
Differential input voltage	**$\|V_{ID}\|$**	0.2		0.6	V	
Differential input leakage current	RxVTH	-10		+10	V	
LVDS Digital Operating Current	Iddlvsd	-	40(TBD)	50	mA	Fclk=65Mhz, VDD=3.3V
LVDS Digital Standby Current	Istlvds	-	10(TBD)	50	uA	Clock & all functions are stop



LVDS DC Characteristic

3.3.3 Output Timing Table

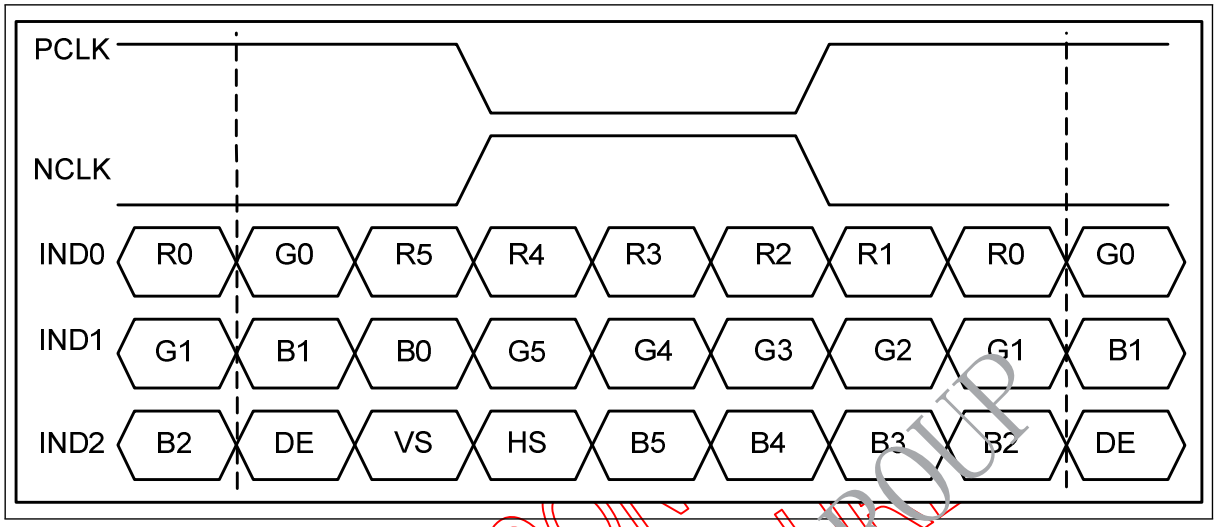
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
DCLK frequency	Fclk	-	65	71	MHz	VDD =2.3~3.6V
DCLK cycle time	Tclk	14.1	15.4		ns	
DCLK pulse duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso	-	64	-	DCLK	
Time from HSD to LD	Thld	-	64	-	DCLK	
Time from HSD to STV	Thstv	-	2	-	DCLK	
Time from HSD to CKV	Thckv	-	20	-	DCLK	
Time from HSD to OEV	Thoev	-	4	-	DCLK	
LD pulse width	Twld	-	10	-	DCLK	
CKV pulse width	Twckv	-	66	-	DCLK	
OEV pulse width	Twoev	-	74	-	DCLK	



Source Output Timing(Cascade)

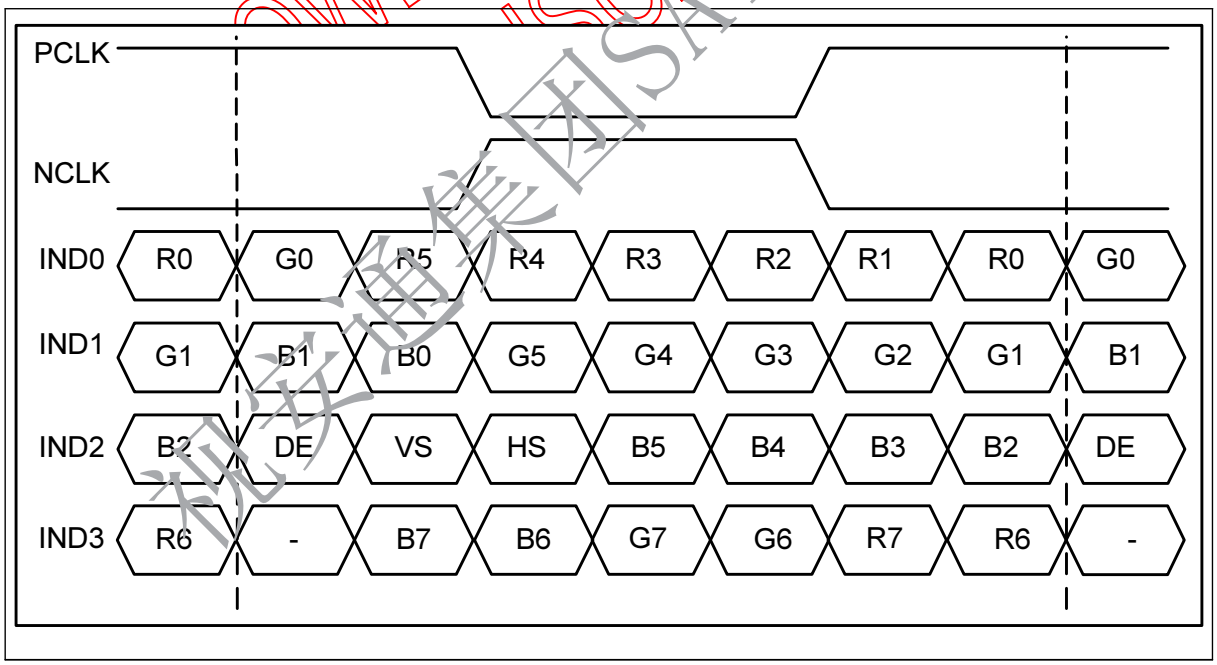
3.3.4. Data Input Format

6-bit LVDS input(HSD="H")



6-bit LVDS Input Timing chart

8-bit LVDS input(HSD="L"



8-bit LVDS Input Timing chart

4. Optical Specifications

Ta=25 ℃

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	50	60	--	Degree	Note1
		θB		60	70	--		
		θL		70	80	--		
		θR		70	80	--		
Contrast Ratio		CR	θ=0°	600	800	--		Note4
Response Time		T_{ON}	25℃	--	25	40	ms	Note3
		T_{OFF}						
Chromaticity	White	x	Backlight is on	0.273	0.313	0.353		Note2 Note5 Note6
		y		0.289	0.329	0.369		
	Red	x		0.573	0.593	0.613		
		y		0.315	0.335	0.355		
	Green	x		0.322	0.342	0.362		
		y		0.580	0.600	0.620		
	Blue	x		0.138	0.158	0.178		
		y		0.091	0.111	0.131		
Uniformity		U		75	80	--	%	Note7
NTSC				--	50	--	%	
Luminance		L		60	110	--	cd/m^2	Note6

Test Conditions:

1. DV_{DD}=3.3V, I_L=120mA(Backlight current),the amblent temperature is25 ℃.
2. The test systems refer to Note 2.

Note 1: Definition of viewing angle range

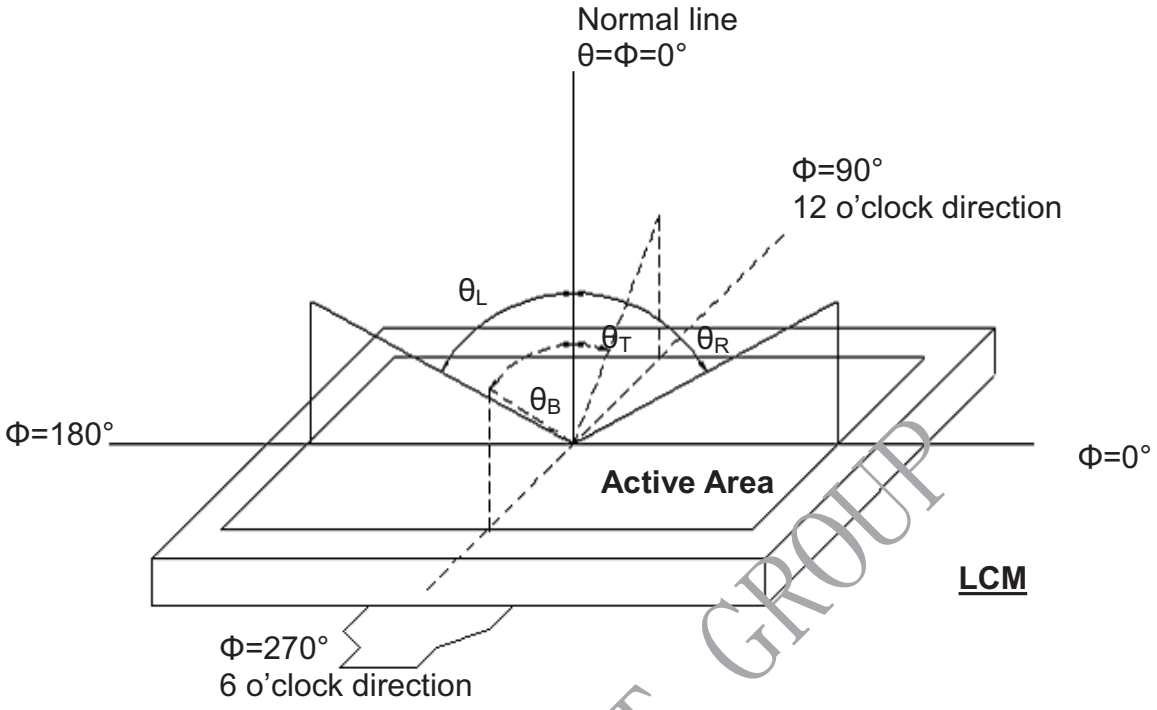


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.
The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

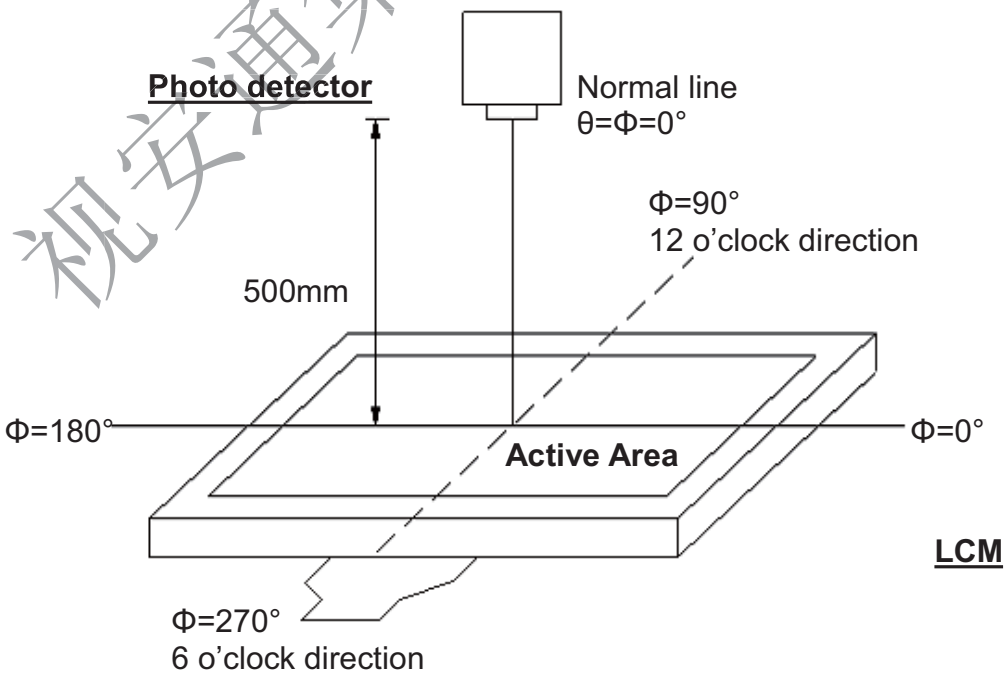


Fig. 4-2 Optical measurement system setup

Note 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_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

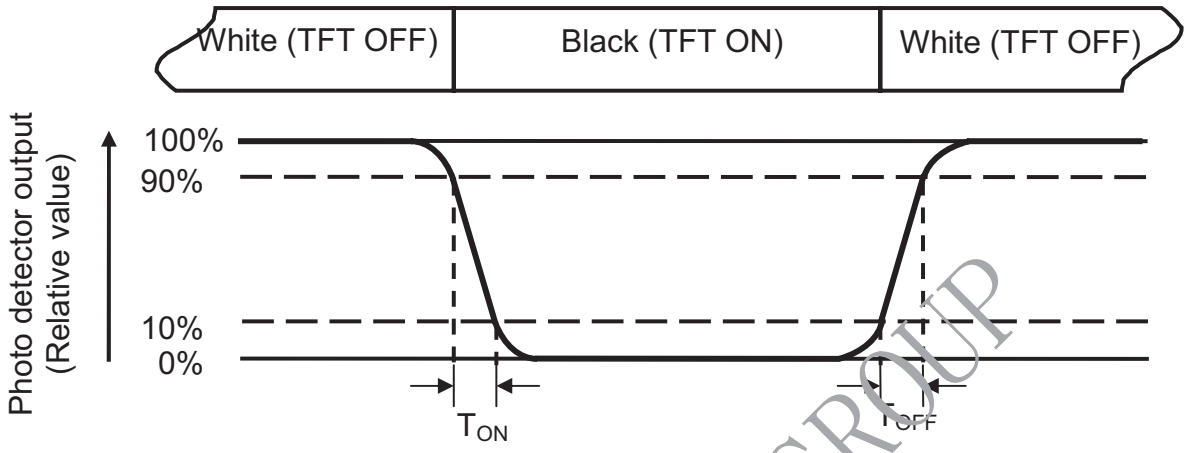


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

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

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel.

Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 4-4).Every measuring point is placed at the center of each measuring area.

$$Luminance\ \ Uniformity\ (Yu) = \frac{B_{min}}{B_{max}}$$

L-------Active area length W----- Active area width

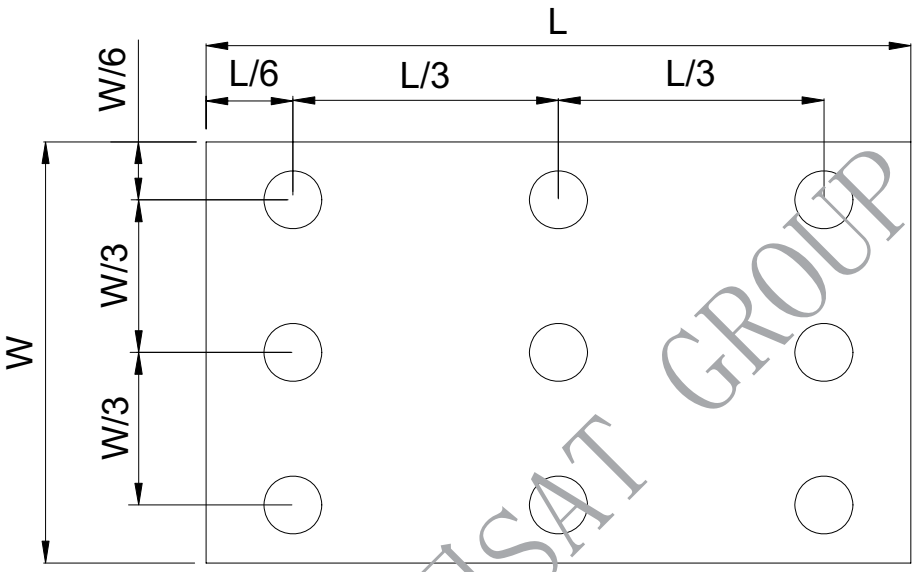


Fig. 4-4 Definition of measuring points

B_{max}: The measured maximum luminance of all measurement position.
B_{min}: The measured minimum luminance of all measurement position.

5. Reliability Test Items

(Note3)

Item	Test Conditions	Remark
High Temperature Storage	Ta = 80℃ 240hrs	Note 1，Note 4
Low Temperature Storage	Ta = -30℃ 240hrs	Note 1，Note 4
High Temperature Operation	Ts = 70℃ 240hrs	Note 2，Note 4
Low Temperature Operation	Ta = -20℃ 240hrs	Note 1，Note 4
Operate at High Temperature and Humidity	+60℃, 90%RH 240hrs	Note 4
Thermal Shock	-30℃/30 min ~ +80℃/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.	Note 4
Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
Mechanical Shock	100G 6ms,±X, ±Y, ±Z 3 times for each direction	
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X. Y. Z. (6 hours for total)	
Package Drop Test	Height:60 cm 1 corner, 3 edges, 6 surfaces	
Electro Static Discharge	± 2KV, Human Body Mode, 100pF/1500Ω	

Note 1: Ta is the ambient temperature of samples.
Note 2: Ts is the temperature of panel's surface.
Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.
Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

6. General Precautions

6.1. 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.

6.2. 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.

6.3. 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.

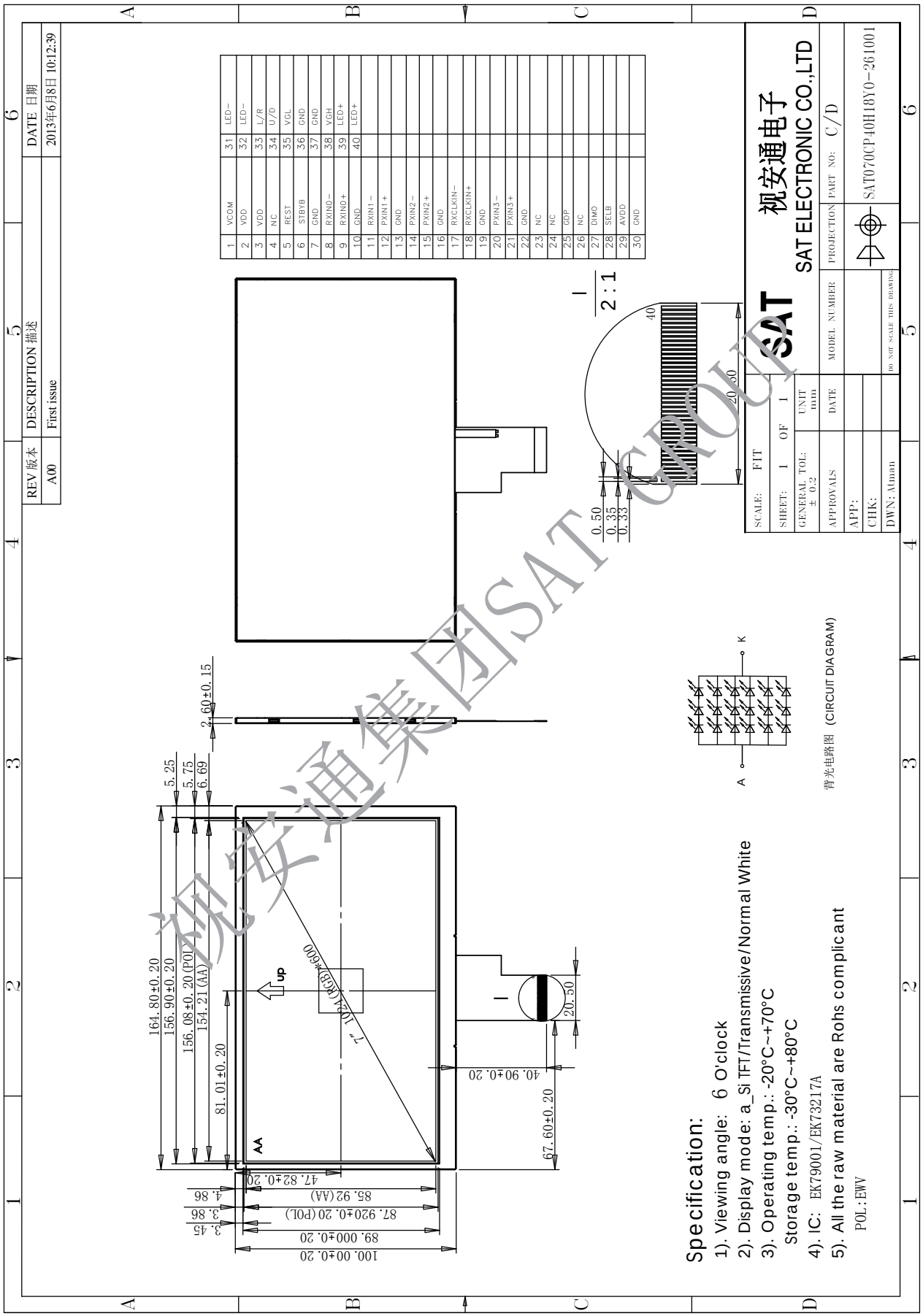
6.4. Storage

1. Store the module in a dark room where must keep at 25±10℃ 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.

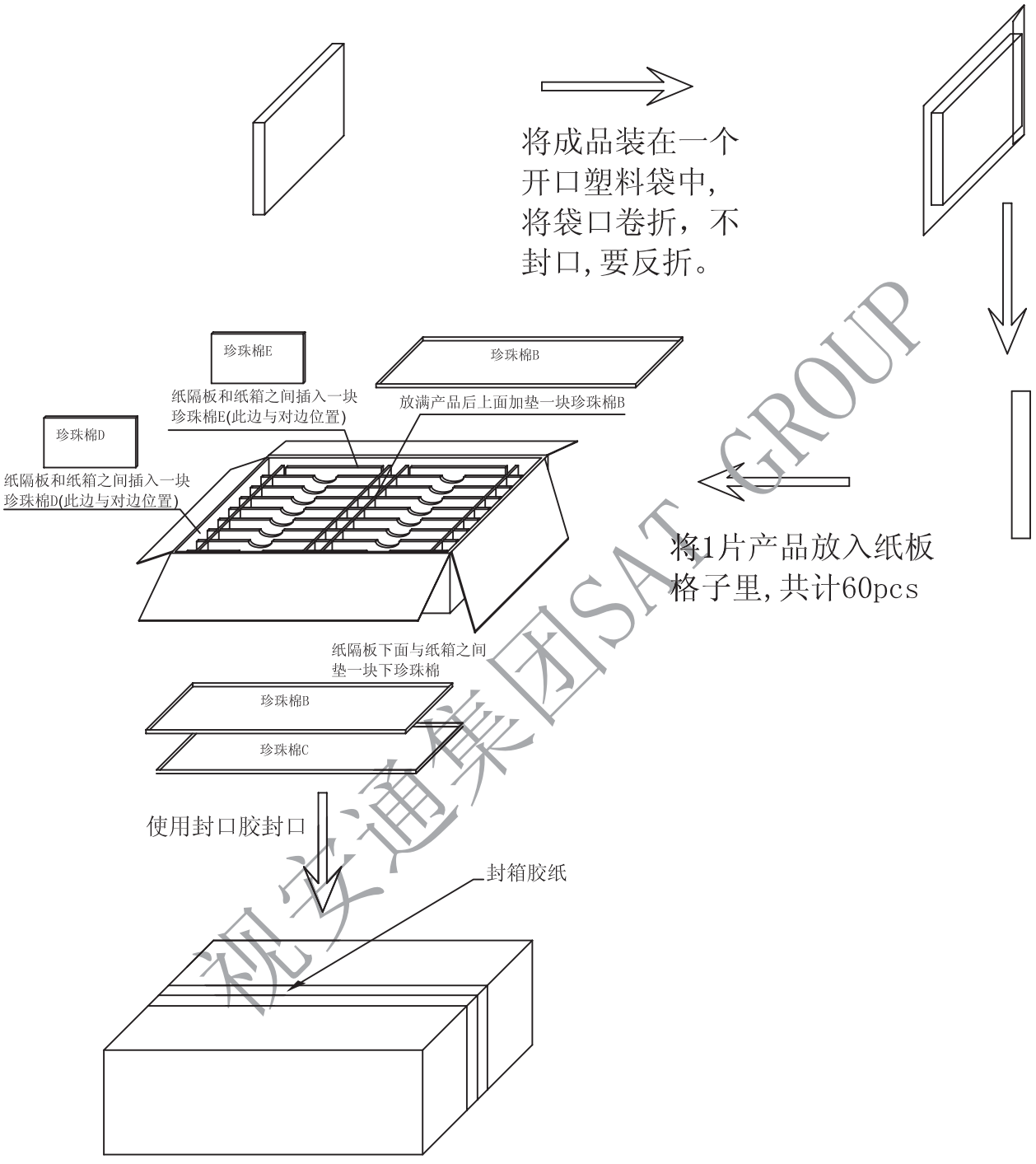
6.5. Cleaning

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.

7. Mechanical Drawing

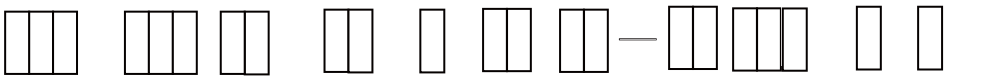


8. Package Drawing



9 . Product ID Rule

Product Name



No	Definition	Specifications
(1)	TFT LCM Productor No.	**SAT**---- **SAT ELECTRONIC CO.LTD**
(2)	Display monitor opposite angle line size	Unit :inch or mmm (size <10 inch: takes two integers ; size >=10 inch: takes three integers)
(3)	LCD Type	AU----AUO ; CP----CPT ; PV----PVI ; TM----TIANMA ; HS----HSD ; LG----LG ; Wi----Wintek ; CM----CMO ; HY----Hydis ; HI----Hitach; Sh----Sharp ; BO---BOE 。。。
(4)	Interface PIN Number	By two figures characters expression from 01 to 99
(5)	Interface Signal Type	A---- Alternated Video Signal; D---- Data Video Signal; H----HDV; I----IPS
(6)	LED backlight Lamp Number	By two figures characters expression from 01 to 99
(7)	LED Back Light colored warp	Rx----red ; Gx----green ; Bx---- blueness; Yx----white; P----PVI; x---- warp distinction,1 minimal,9 maximal
(8)	Thickness	By two figures characters expression from 01 to 99

No	Definition	Specifications
(9)	Width	By three figures characters expression from 001 to 999
(10)	Product information	By one figure characters expression from 0 to 9
(11)	FPC Type	S---short M---Middle L---Long