

---

# Product Specification

**Customer :** \_\_\_\_\_  
**Model Name:** SAT101BO40C06I-GG253156LQ  
**ERP NO. :** 1091010072  
**Spec Vision:** V.3  
**Date:** 2021/08/19

- Preliminary Specification  
 Final Specification

Approved by	Comment

Prepared by	Reviewed by	Approved by



---

# Contents

1. General Specifications.....	4
2. Pin Assignment.....	5
2.1. LCM PIN.....	5
2.2. TP PIN.....	7
3. ELECTRICAL CHARACTERISTICS.....	8
3.1. Absolute Maximum Ratings.....	8
3.1.1. Typical Operation Range.....	8
3.1.2. Current Consumption.....	9
3.1.3. Backlight Driving Conditions.....	9
3.2. Power Sequence.....	10
3.2.1. Power On/Off Sequence.....	10
3.2.2. Power-On/Off Timing Sequence.....	10
3.3. Timing Characteristics.....	12
3.3.1. DC Electrical Characteristics.....	12
3.3.2. AC Electrical Characteristics.....	13
3.3.3. Data Input Format.....	15
3.3.4. Output Timing Table.....	16
3.3.5. Timing.....	18
4. Optical Specifications.....	19
5. Reliability Test Items.....	22
6. Mechanical Drawing.....	23
7. Package Drawing.....	24
8. Numbering System.....	25

---

# 1. General Specifications

10.1" is a color active matrix thin film transistor (TFT) IPS liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, Driver IC, FPC and Backlight.

NO.	Item	Specification	Remark
1	Panel Size	10.1 inch(Diagonal)	
2	Resolution	1024 x 3(RGB) x 600	
3	Driver Method	a-Si TFT active matrix	
4	Active Area	222.72(W) x 125.28(H) mm	
5	Pixel Pitch	0.2175 (W) x 0.2088(H) mm	
6	Pixel Arrangement	RGB-stripe	
7	Module Size	235 (W) x 143(H) x2.8(D) mm	
8	Display Mode	Normally Black	
9	Viewing Direction	ALL	
10	Interface	LVDS	
11	Driving IC	EK79001+EK73215	
12	Weight	TBD	g

Note 1: Color tune is slightly changed by temperature and driving voltage.

Note 2: LCM weight tolerance:  $\pm 5\%$

---

## 2. Pin Assignment

### 2.1. LCM PIN

No.	Symbol	Function	Remarks
1	VCOM	Common Voltage	
2~3	VDD	Power for Digital Circuit 3.3V	
4	NC	No connection	
5	RESET	Global reset pin 3.3V	
6	STBYB	Standby mode, Normally pull high. STBYB = "1", normal operation STBYB = "0", timing controller, source driver will turn off, all output are High-Z	
7	GND	Power ground	
8	Rxin0-	Negative LVDS differential data inputs	
9	Rxin0+	Positive LVDS differential data inputs	
10	GND	Power ground	
11	Rxin1-	Negative LVDS differential data inputs	
12	Rxin1+	Positive LVDS differential data inputs	
13	GND	Power ground	
14	Rxin2-	Negative LVDS differential data inputs	
15	Rxin2+	Positive LVDS differential data inputs	
16	GND	Power ground	
17	RxCLKIN-	Negative LVDS differential clock inputs	
18	RxCLKIN+	Positive LVDS differential clock inputs	
19	GND	Power ground	
20	Rxin3-	Negative LVDS differential data inputs	
21	Rxin3+	Positive LVDS differential data inputs	

22	GND	Power ground	
23~24	NC	No connection	
25	GND	Power ground	
26	NC	No connection	
27	DIMO	Backlight dimmer signal for external controller. DIMO = "0", Turn off external backlight controller DIMO = "1", Logical control signal to turn on external backlight controller	
28	SELB	6bit/8bit mode select H : 6bit / L : 8bit	
29	AVDD	Power for Analog Circuit	
30	GND	Power ground	
31~32	LED-	Power for LED backlight(Cathode)	
33	L/R	Horizontal inversion	
34	U/D	Vertical inversion	
35	VGL	Gate off Voltage	
36~37	NC	No connection	
38	VGH	Gate on Voltage	
39~40	LED+	Power for LED backlight(anode)	

**Note:**

Source Right or Left sequence control. Normally pull high.

SHLR = "L", shift left: last data = S1←S2←S3.....←S1536 = first data.

SHLR = "H", shift right: first data = S1→S2→S3.....→S1536 = last data.

Gate Up or Down scan control. Normally pull low.

UPDN = "L", STV2 output vertical start pulse and UD pin output logical "0" to Gate driver.

UPDN = "H", STV1 output vertical start pulse and UD pin output logical "1" to Gate driver

---

## 2.2. TP PIN

No.	Symbol	Function	Remarks
1	GND		
2	SDA		
3	SCL		
4	INT		
5	RST		
6	VCC2.8		

## 3. ELECTRICAL CHARACTERISTICS

### 3.1. Absolute Maximum Ratings

Voltage (AGND=GND=0V, Ta = 25°C)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power Voltage	V <sub>DD</sub>	-0.5	+5	V	
	AV <sub>DD</sub>	-0.5	+15		
	V <sub>GH</sub>	-0.3	+42		
	V <sub>GL</sub>	-20	+0.3		
	V <sub>GH</sub> -V <sub>GL</sub>	-	+40		
Operating Temperature	T <sub>op</sub>	-20	60	°C	
Storage Temperature	T <sub>st</sub>	-20	60	°C	

**Note:** 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 case, the module may be permanently destroyed.

#### 3.1.1. Typical Operation Range

Item	Symbol	values			Unit
		Min.	Typ.	Max.	
Power Voltage	V <sub>DD</sub>	3.0	3.3	3.6	V
	AV <sub>DD</sub>	9.4	9.6	9.8	V
	V <sub>GH</sub>	17	18	19	V
	V <sub>GL</sub>	-7.0	-6.0	-5.0	V
Input signal voltage	V <sub>COM</sub>	3.95	4.15	4.35	V
Input logic high voltage	V <sub>IH</sub>	0.7V <sub>DD</sub>	-	V <sub>DD</sub>	V
Input logic low voltage	V <sub>IL</sub>	0	-	0.3V <sub>DD</sub>	V

**Note:** 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 case, the module may be permanently



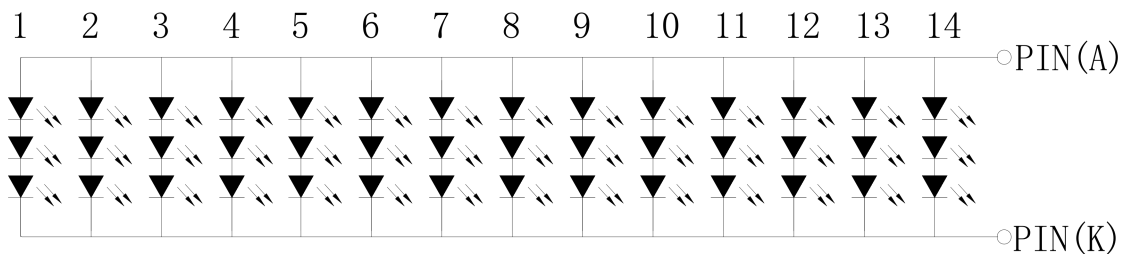
destroyed.

### 3.1.2. Current Consumption

Item	Symbol	values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	I <sub>GH</sub>	-	1	-	mA	V <sub>GH</sub> =18V
	I <sub>GL</sub>	-	1	-	mA	V <sub>GL</sub> =-6V
	I <sub>VDD</sub>	-	30	-	mA	V <sub>DD</sub> =3.3V
	I <sub>AVDD</sub>	-	25	-	mA	A <sub>VDD</sub> =9.6V

### 3.1.3. Backlight Driving Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage of white LED backlight	V <sub>L</sub>	8.4	9.3	10.2	V	3S14P
Current for LED backlight	I <sub>L</sub>	-	280	-	mA	20mA/LED
Power dissipation	P <sub>d</sub>		2604		mW	42LED
Luminance (on the module surface, BM-7)		400	450	-	cd/m <sup>2</sup>	
LED life time	-	30000	-	-	Hr	



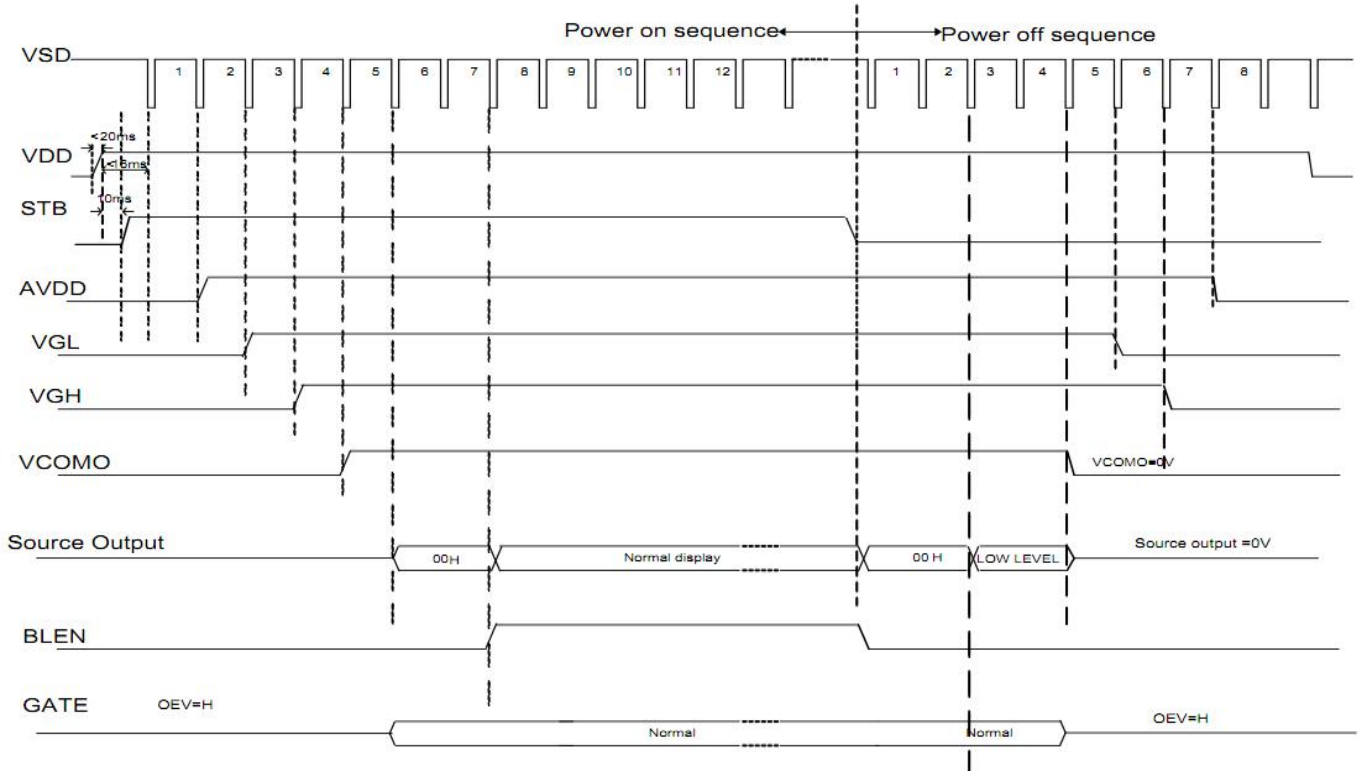
电路原理图：  
(I<sub>f</sub>=280mA. V<sub>f</sub>=9.3±0.9V)

## 3.2. Power Sequence

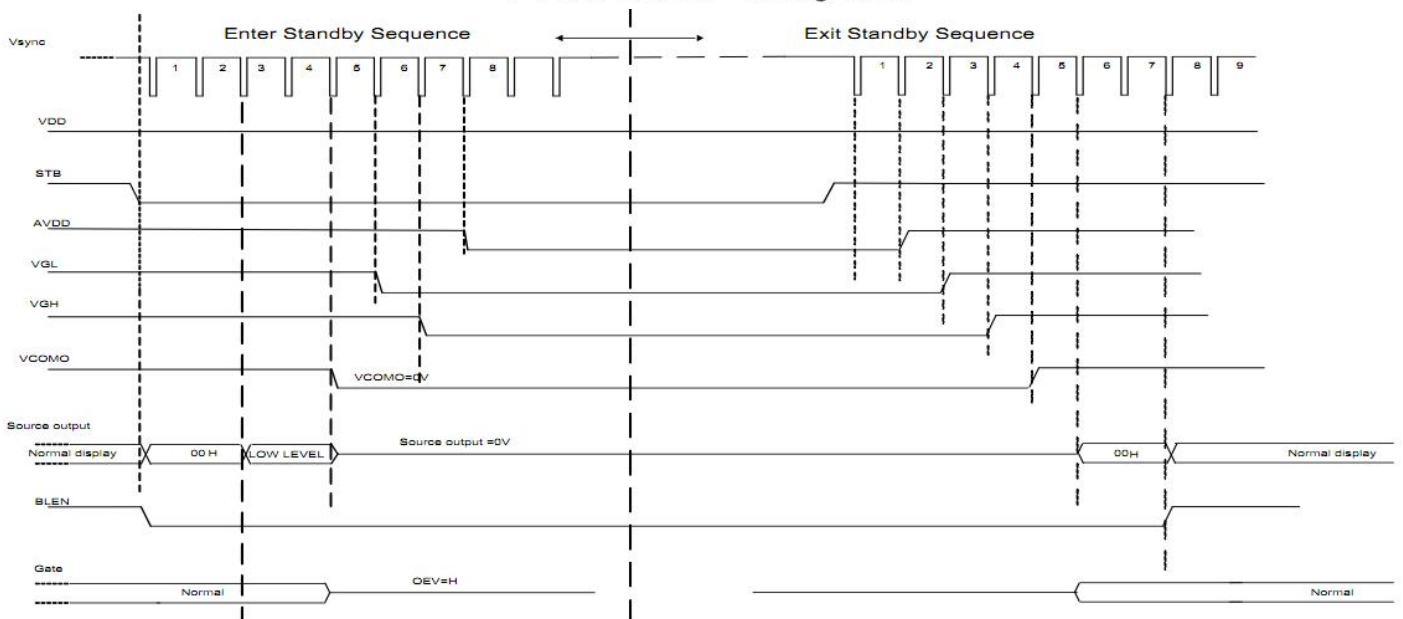
### 3.2.1. Power On/Off Sequence

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.

### 3.2.2. Power-On/Off Timing Sequence



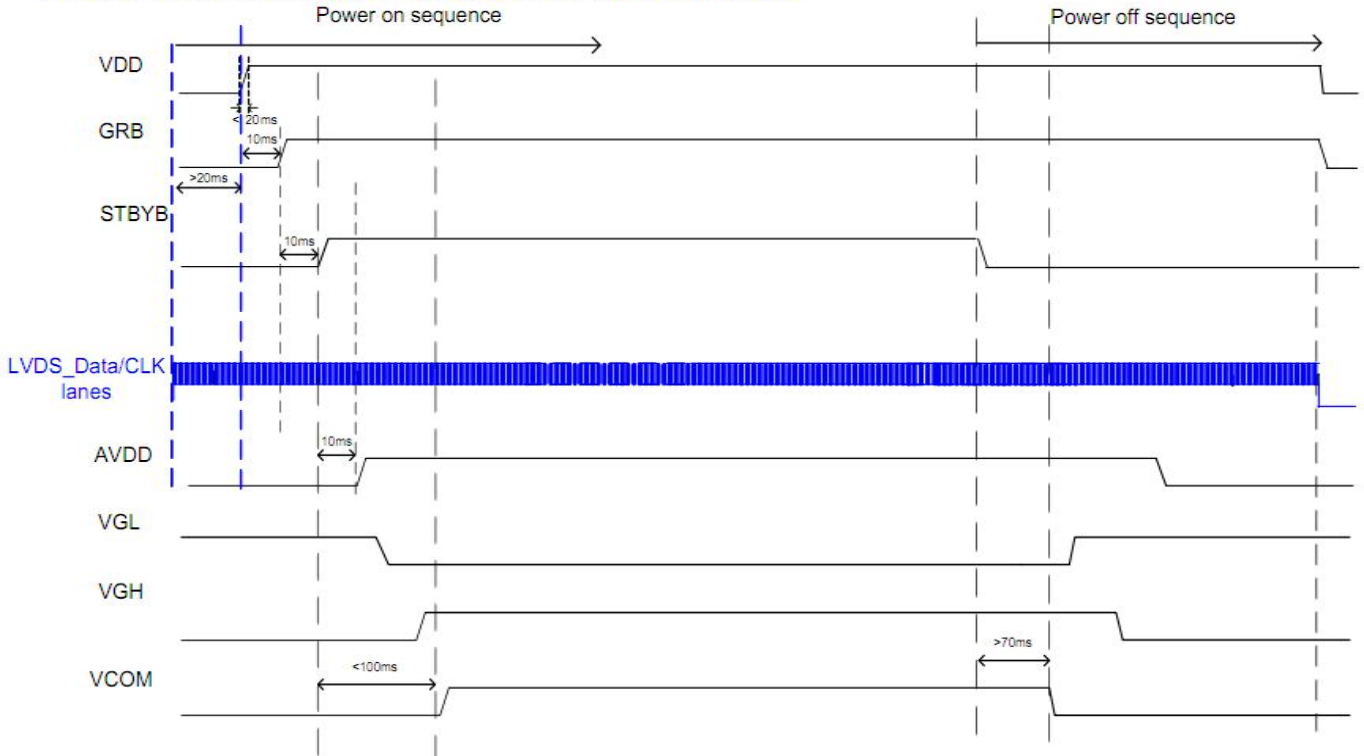
Power On/Off timing chart



Enter and Exit Standby Mode timing chart

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

### Power-On/Off Timing Sequence for LVDS Interface



### 3.3. Timing Characteristics

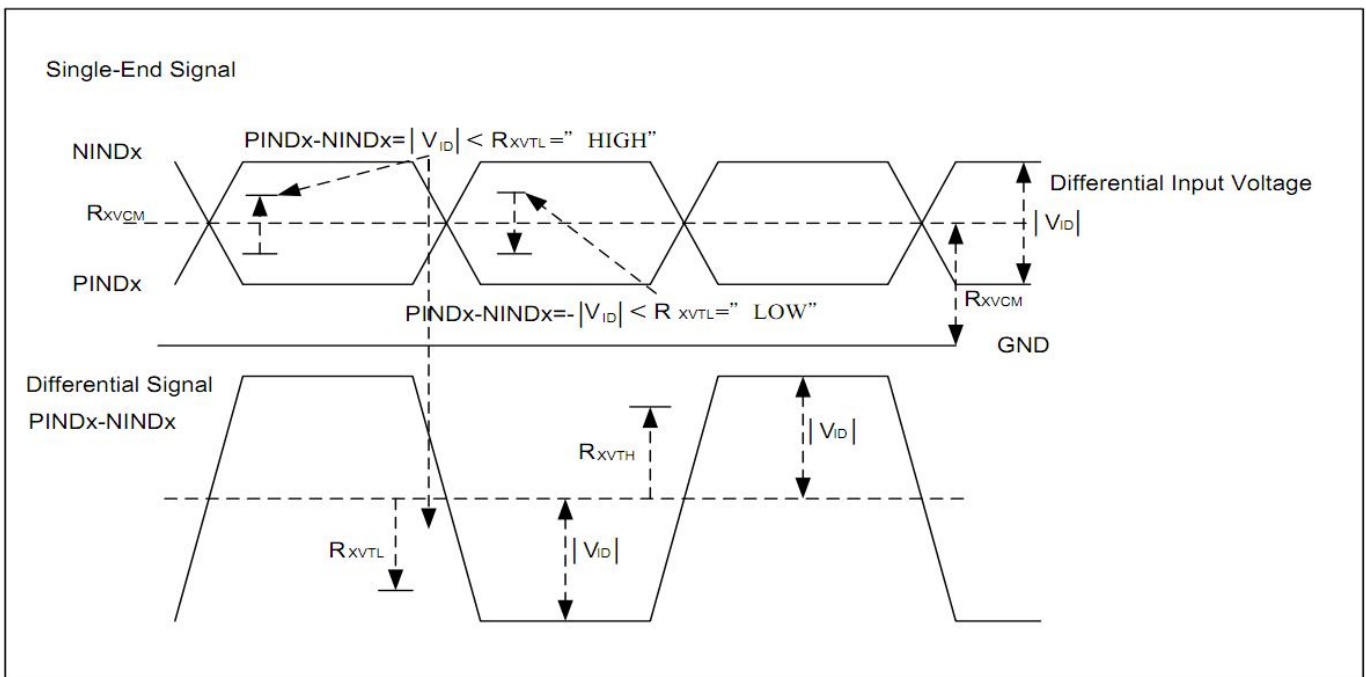
#### 3.3.1. DC Electrical Characteristics

(TA = -20 to 85°C, VDD = 2.3 to 3.6V, AVDD = 8 to 13.5V, GND = AGND = GND\_LVDS = 0V)

##### LVDS mode(Receiver Differential :PIND0~PIND3,NIND0~NIND3,PINC,NINC)

LVDS DC characteristic

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	R <sub>xVTH</sub>			+0.1V	V	R <sub>xVCM</sub> =1.2V
Differential input low threshold voltage	R <sub>xVTL</sub>	-0.1			V	
Input voltage range(single-end)	R <sub>xVIN</sub>	0		2.4	V	
Differential input common mode voltage	R <sub>xVCM</sub>	V <sub>ID</sub>  /2		2.4 - V <sub>ID</sub>  /2	V	
Differential input voltage	V <sub>ID</sub>	0.2		0.6	V	
Differential input leakage current	R <sub>xVTH</sub>	-10		+10	V	
LVDS Digital Operating Current	I <sub>ddlvsd</sub>	-	40(TBD)	50	mA	Fclk=65Mhz, VDD=3.3V
LVDS Digital Standby Current	I <sub>stlvds</sub>	-	10(TBD)	50	uA	Clock & all functions are stop



LVDS DC Characteristic

Power

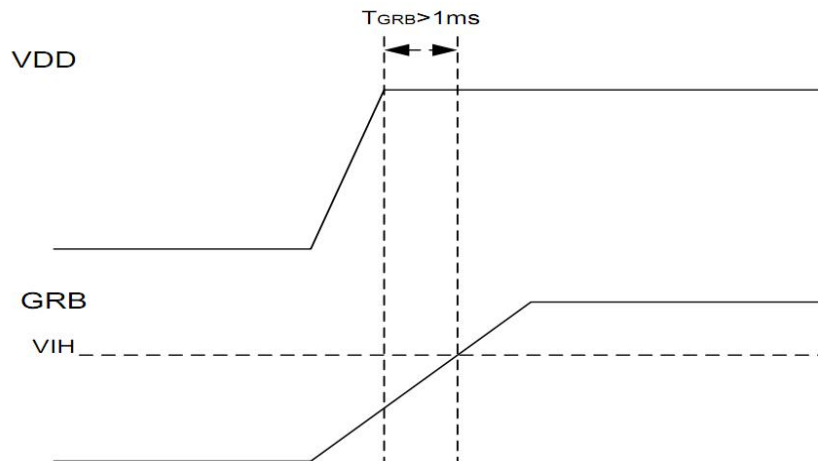
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
VCOM buffer input voltage	VCOMI	1	-	AVDD	V	
VCOM buffer output voltage	VCOMO	VCOMI-0.2	VCOMI	VCOMI+0.2	V	
VCOM buffer output current	IVCOM	-	-	10	mA	VCOMO=5V vs 4.9V

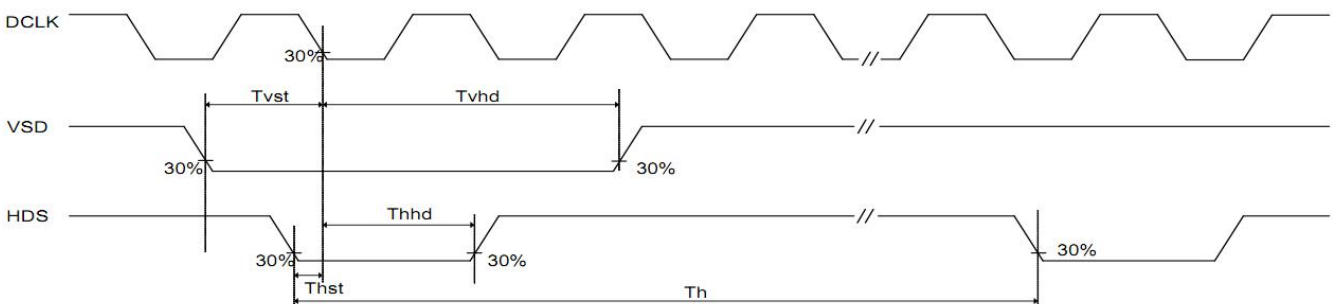
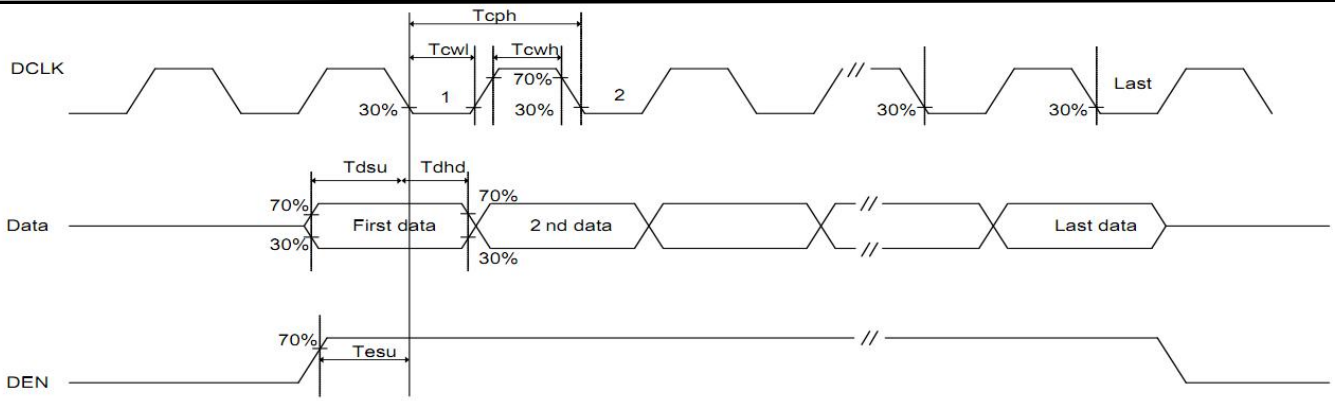
### 3.3.2. AC Electrical Characteristics

(TA = -20 to 85°C, VDD = 2.3 to 3.6V, AVDD = 8 to 13.5V, GND = AGND = 0V)

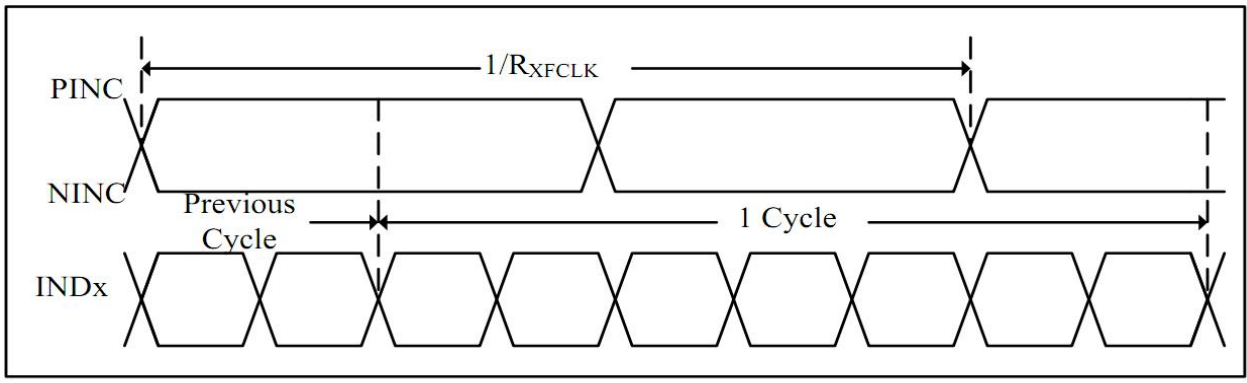
LVDS mode

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

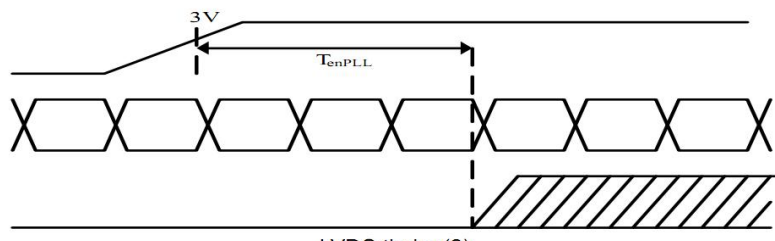




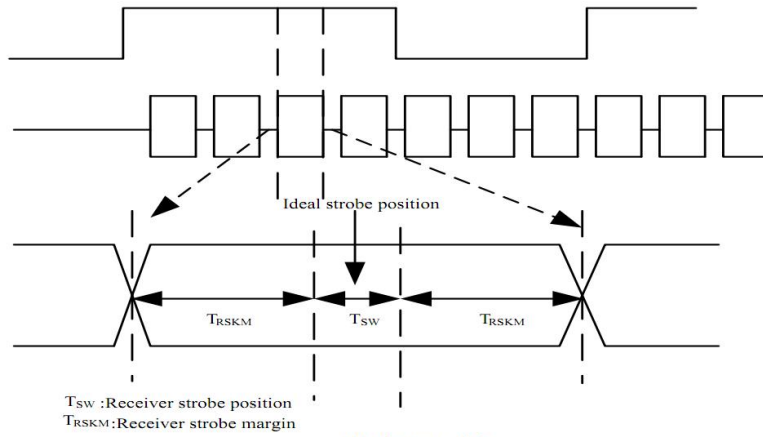
Parallel Input Clock and Data timing



LVDS timing(1)



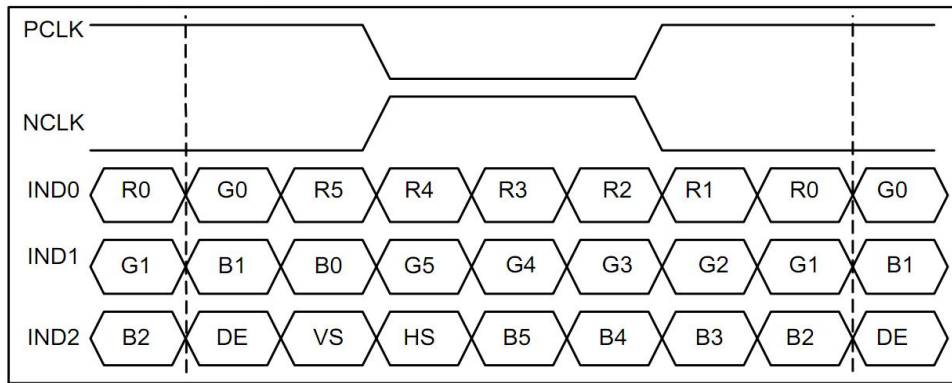
LVDS timing(2)



LVDS timing(3)

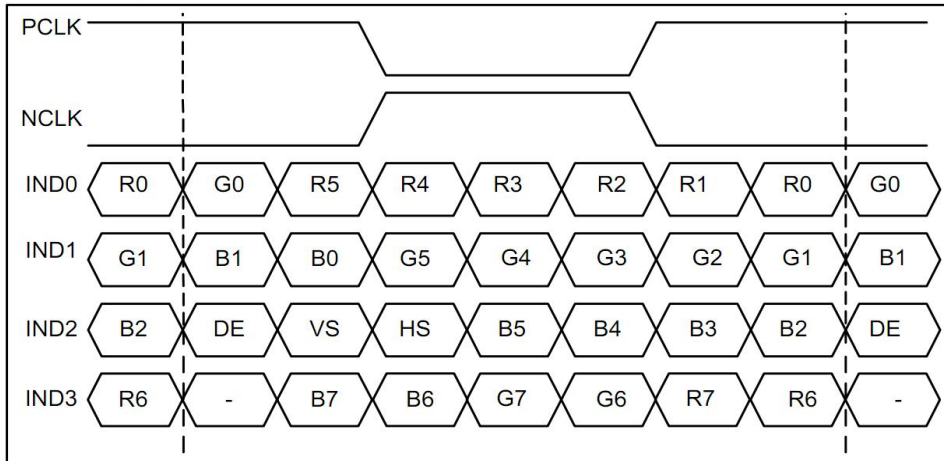
### 3.3.3. Data Input Format

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



6-bit LVDS Input Timing chart

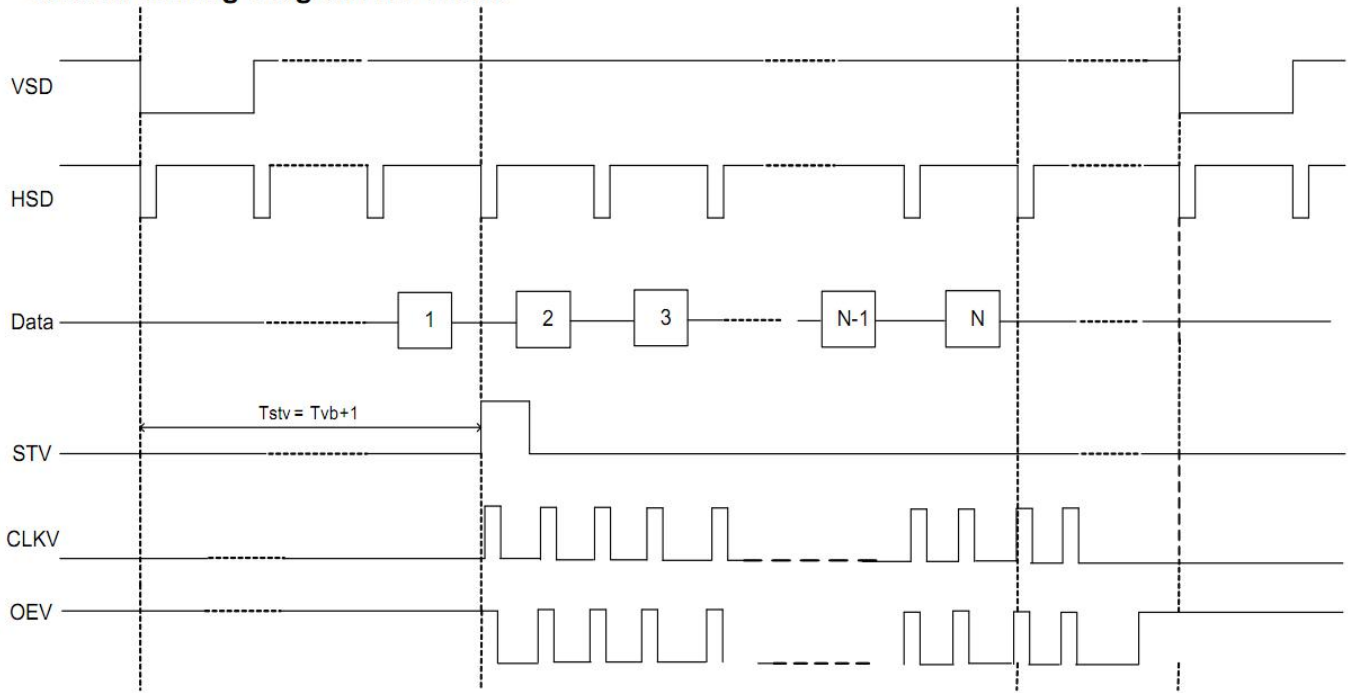
8-bit LVDS input(HSD="L")



8-bit LVDS Input Timing chart

### 3.3.4. Output Timing Table

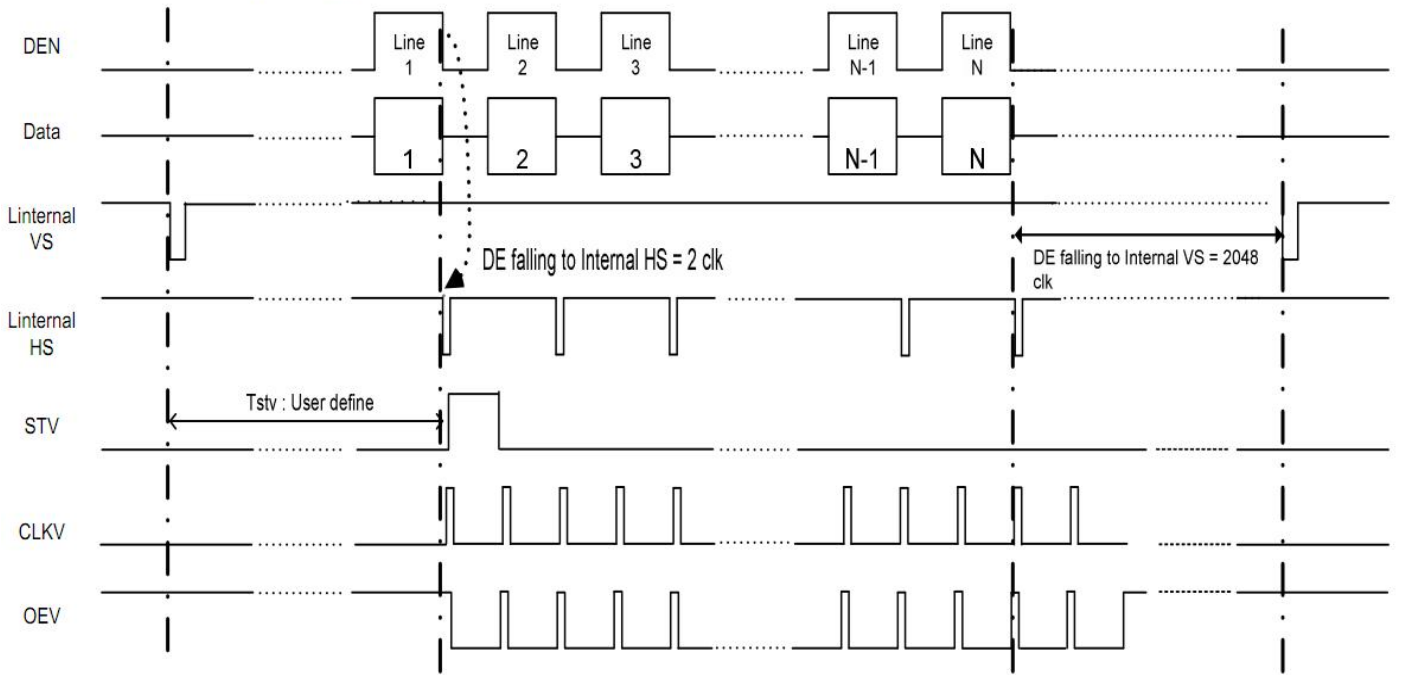
Vertical Timing Diagram HV mode



Vertical Timing Diagram HV mode

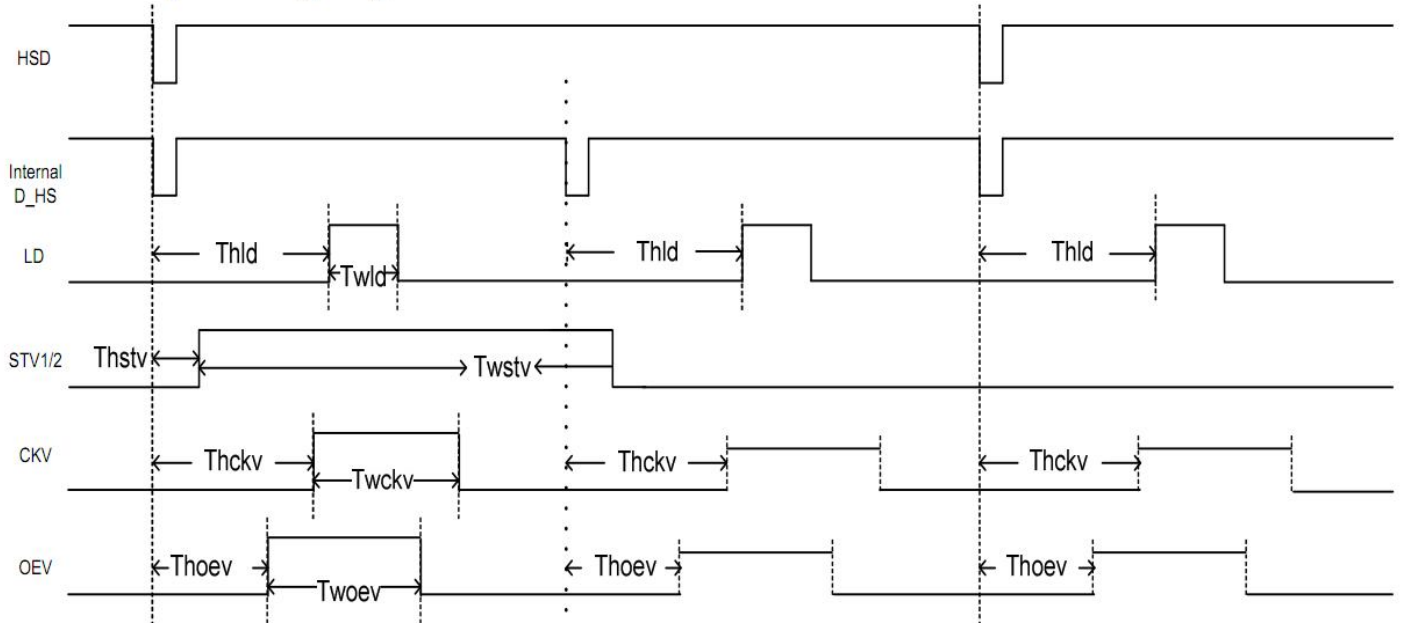


### Vertical Timing Diagram DE mode



Vertical Timing Diagram DE mode

### Gate output timing diagram



Gate output timing diagram

### 3.3.5. Timing

DE mode

DE mode					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd	1024			DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	tvd	600			H
VSYNC period time	tv	610	635	800	H
VSYNC blanking	tvb+tvfp	10	35	200	H

HV mode(1)

HV mode					
Horizontal input timing					
Parameter	Symbol	Value			Unit
Horizontal display area	thd	1024			DCLK
DCLK frequency@ Frame rate=60hz	fclk	Min.	Typ.	Max.	Mhz
		44.9	51.2	63	
1 Horizontal Line	th	1200	1344	1400	DCLK
HSYNC pulse width	thpw	Min.	1		
		Typ.	-		
		Max.	140		
HSYNC back porch	thbp	160	160	160	
HSYNC front porch	thfp	16	160	216	

HV mode(2)

Vertical input timing					
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd	600			H
VSYNC period time	tv	624	635	750	H
VSYNC pulse width	tvpw	1	-	20	H
VSYNC back porch	tvb	23	23	23	H
VSYNC front porch	tvfp	1	12	127	H

## 4. Optical Specifications

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note			
Viewing Angle	$\theta T$	$CR \geq 10$	70	85	-	degree	3			
	$\theta B$		70	85	-					
	$\theta L$		70	85	-					
	$\theta R$		70	85	-					
Contrast Ratio	CR	$\Theta=0^\circ$	500	800	-	-	4			
Response Time	$T_{on}+ T_{off}$	25°C	-	30	40	ms	5			
Chromaticity	White	X	LCM	-0.03	0.285	+0.03	-	1		
		Y			0.345					
	Red	X	LCD SPEC	-0.03	0.605	+0.03				
		Y			0.336					
	Green	X			0.297					
		Y			0.552					
	Blue	X			0.139					
		Y			0.132					
Luminance (center)	L				400		450	-	cd/m <sup>2</sup>	1
Luminance Uniformity	$\Delta L$				75		80	-	%	1.2

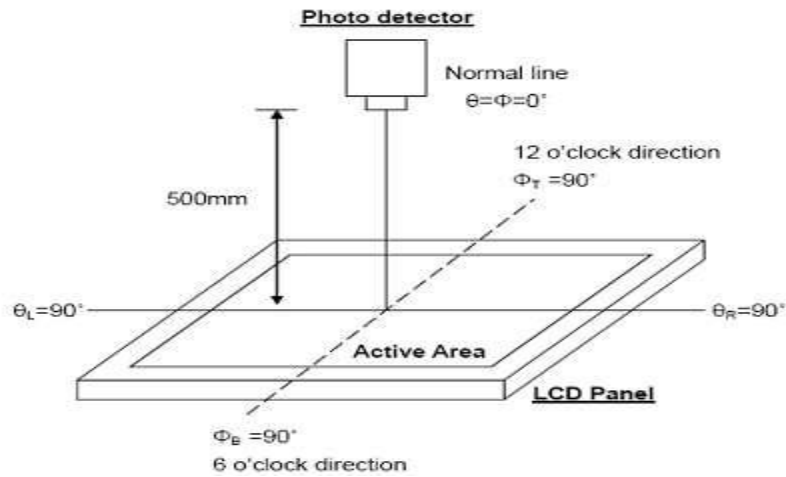
Note: The parameter is slightly changed by temperature, driving voltage and materiel

Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment BM-7 ( $\Phi 8\text{mm}$ )

Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature:  $T_a=25^\circ\text{C}$ .
- Adjust operating voltage to get optimum contrast at the center of the display.

The measured value is more than 5 minutes at the center point of the LCD panel, and the backlight is turned on at the same time.

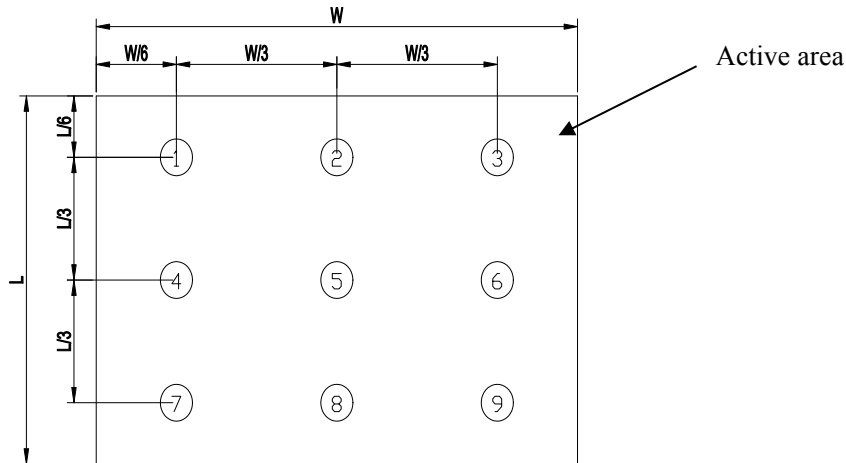


Note 2: The luminance uniformity is calculated by using following formula.

$$\Delta Bp = Bp (\text{Min.}) / Bp (\text{Max.}) \times 100 (\%)$$

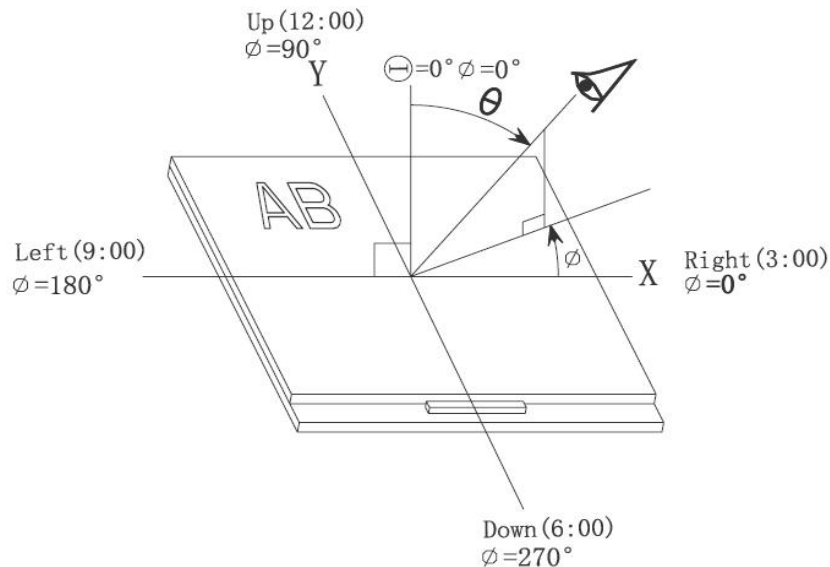
Bp (Max.) = Maximum brightness in 9 measured spots

Bp (Min.) = Minimum brightness in 9 measured spots.



Note 3: The definition of viewing angle:

Refer to the graph below marked by  $\theta$  and  $\phi$



---

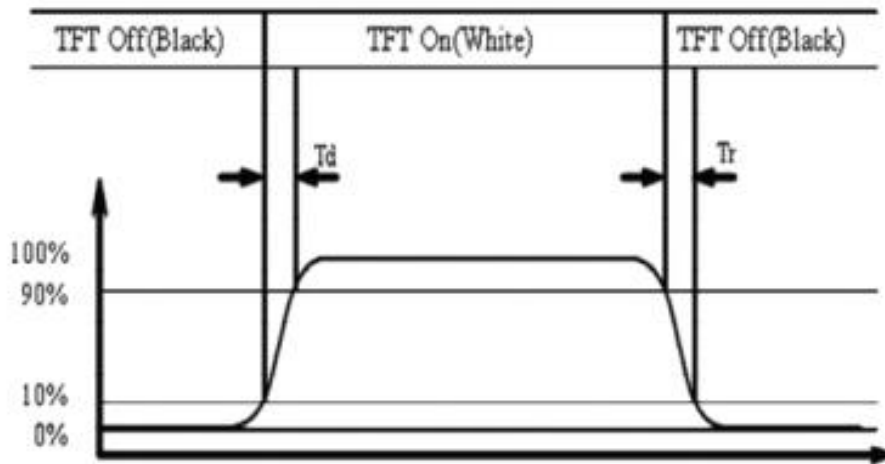
Note 4: Definition of contrast ratio

Contrast measurements shall be made at viewing angle of  $\Theta = 0$  and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

Note 5: Definition of Response time

The output signals of photo detector are measured when the input signals are changed from “black” to “white”(Td) and from “white” to “black”(Tr), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



## 5. Reliability Test Items

Item	Test Conditions	Remark
High Temperature Storage	Ta=60°C, 120Hrs	Note1 ,Note4
Low Temperature Storage	Ta=-20°C, 120 Hrs	Note1, Note4
High Temperature Operation	Ts=60°C, 120 Hrs	Note2 ,Note4
Low Temperature Operation	Ts=-20°C, 120 Hrs	Note4
Operation at High Temperature and Humidity	+40°C,90%RH, 120 Hrs (no condensation)	Note4
Thermal Shock	-20°C/30min~+60°C/30min for a total 48 cycles,	Start with cold temperature and end with high temperature
Package Drop Test	Height 40cm 1corner , 3edges , 6surfaces	
Elector Static Discharge	150pF/330Ω, Contact: ±2KV,Air: ±4KV	Human Body Mode
Image Sticking	25°C ; 1hrs	Note5

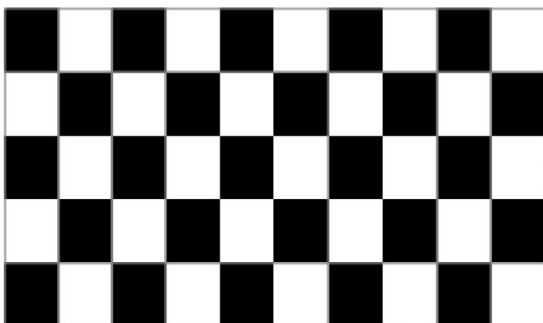
Note1: Ta is the ambient temperature of samples.

Note2: Ts is the temperature of panel's surfaces.

Note3: 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.

Note4: before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note5: Condition of image sticking test :25 °C ±2 °C , Operation with test pattern sustained for 1hrs,then change to gray pattern immediately. after 5 min's, the Mura must be disappeared completely.

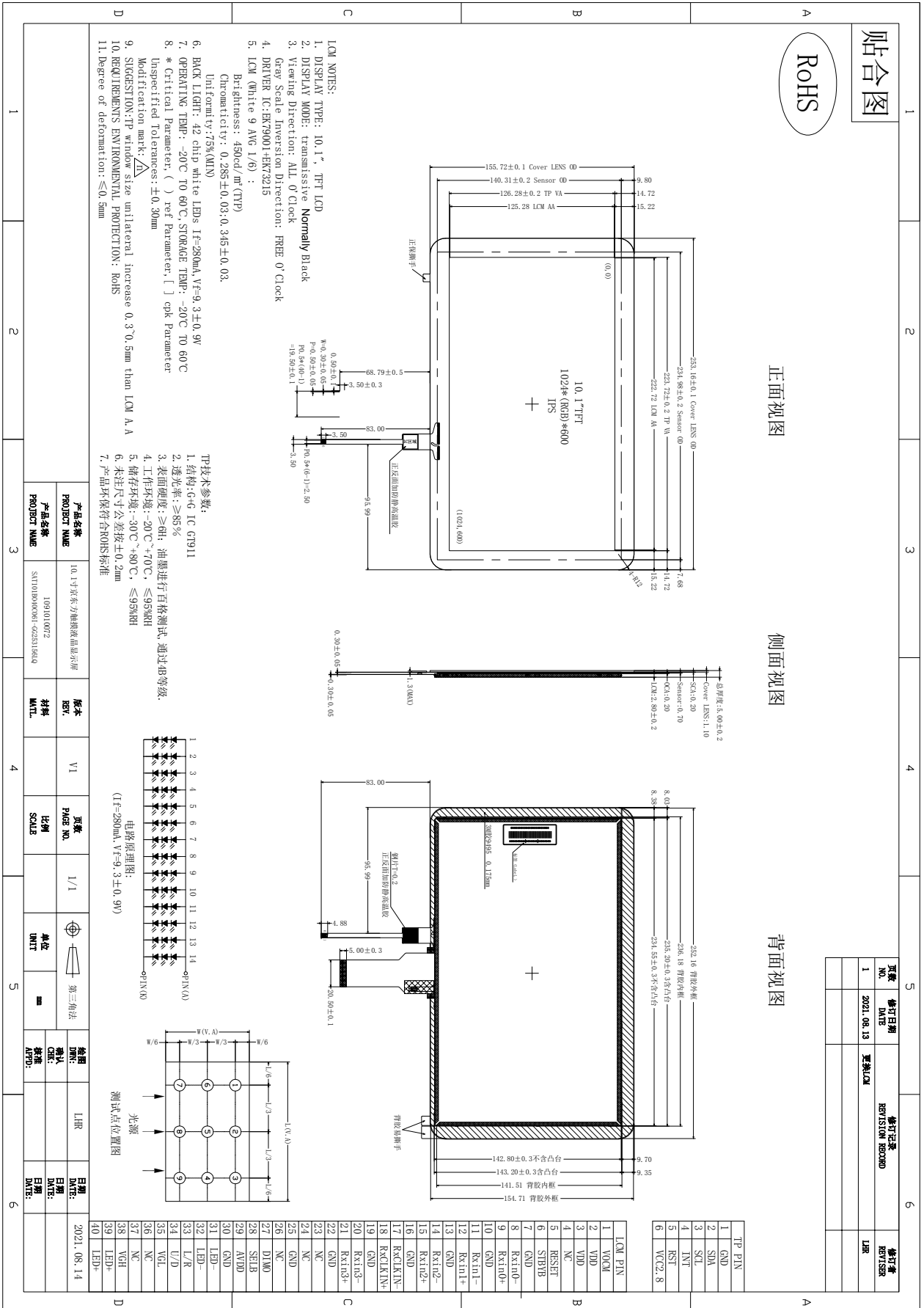


(a) Test Pattern (chess board Pattern )

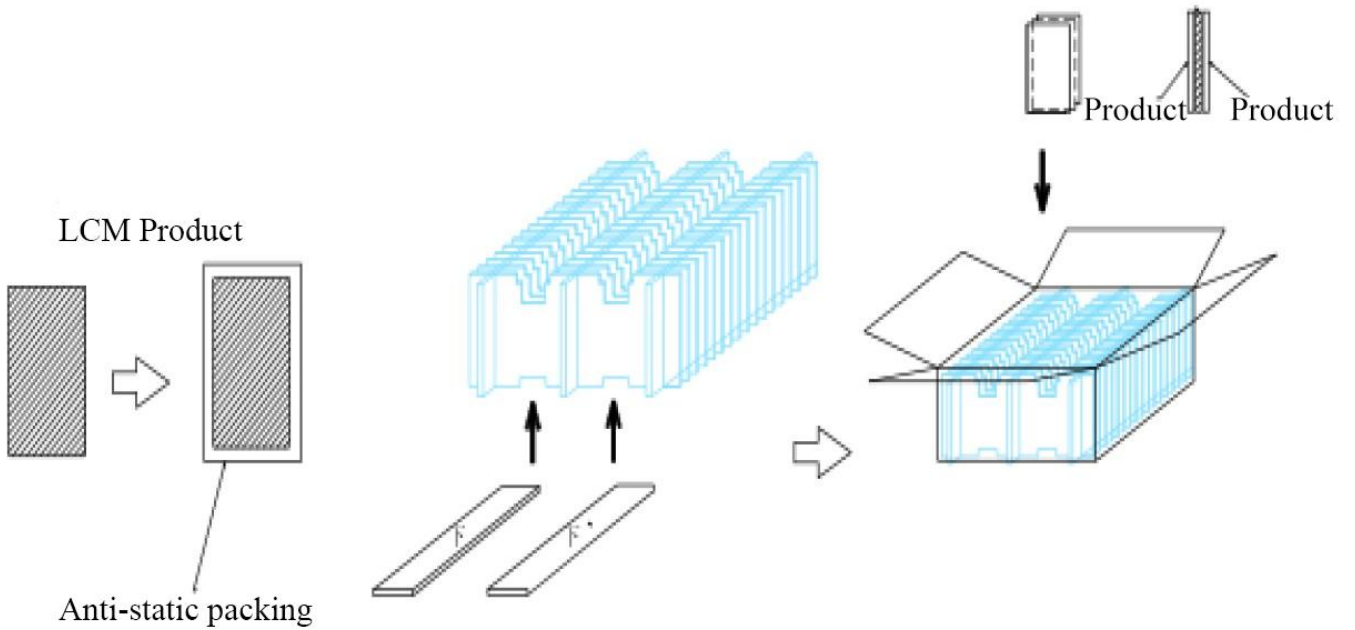


(b) Gray Pattern (127 Gray)

# 6. Mechanical Drawing



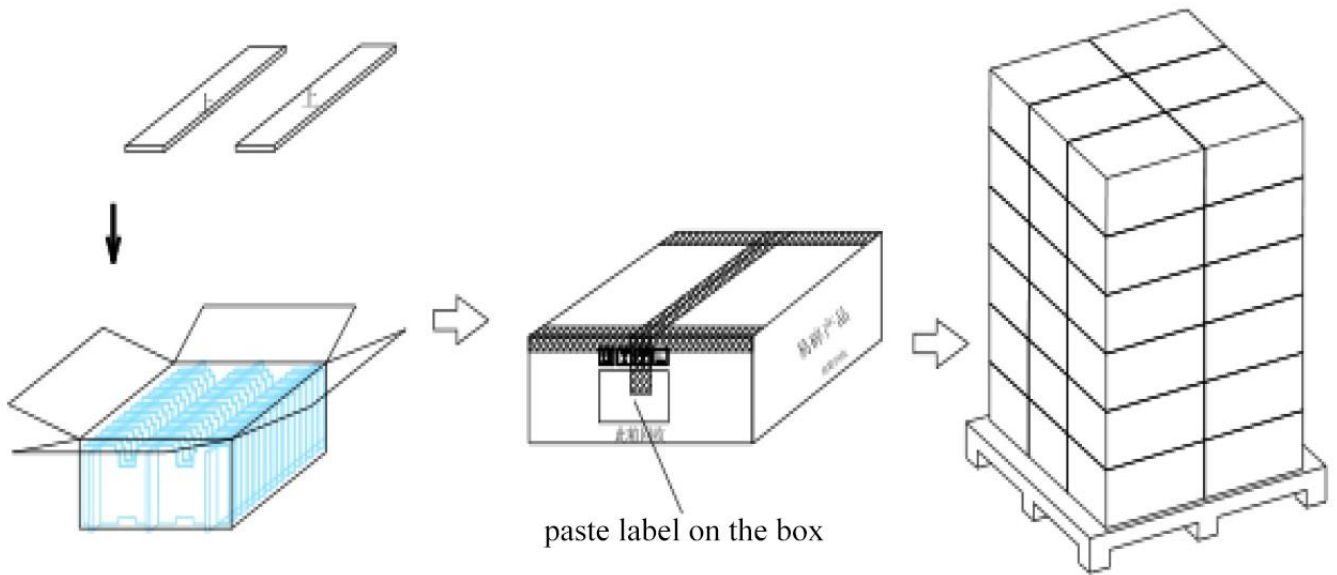
# 7. Package Drawing



**Step One:**  
Put LCM products into Anti-static packing bag.

**Step Two:**  
Assemble the paper strip into cell, quantity and share according to BoM List.

**Step Three:**  
Place products face to face in each groove.



**Step Four:**  
After packing, place the corresponding limit tool on the top.

**Step Five:**  
Seal the carton with tape and label it.

**Step Six:**  
Put each carton on the board and warp it, up to 6 layers.



