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# SPECIFICATION

## COG-T500MINI-01P

- Preliminary Specification
- Final Specification



**TECENSTAR PHOTOELECTRIC  
TECHNOLOGY CO., LTD.**

**CUSTOMER:**

**Made By:**

**Checked By:**

**Approved By:**

**Quality:**

**Date:**

**Note:**

**Approved By:**

**Date:**

**Note:**

## Records of Revision

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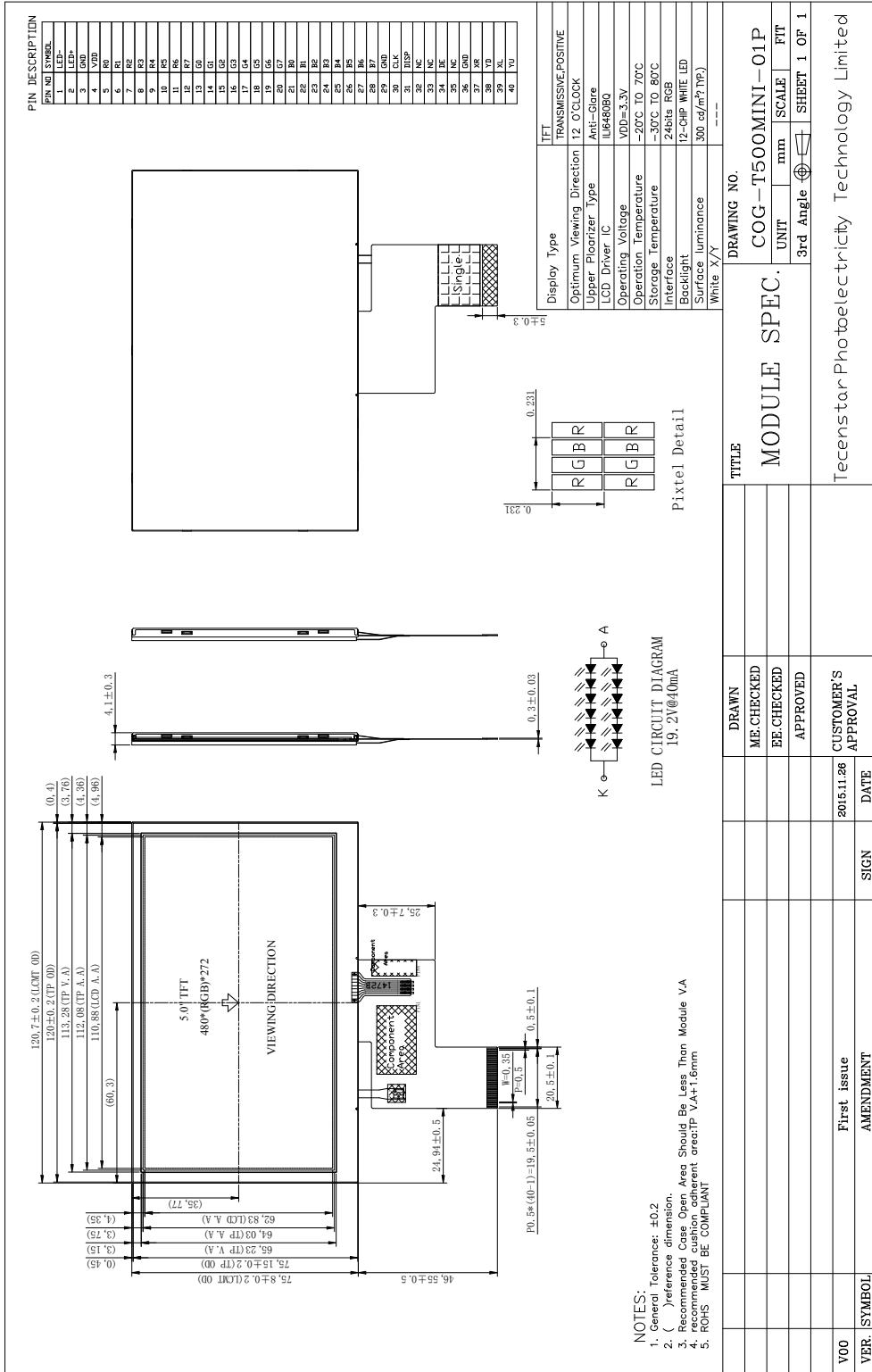
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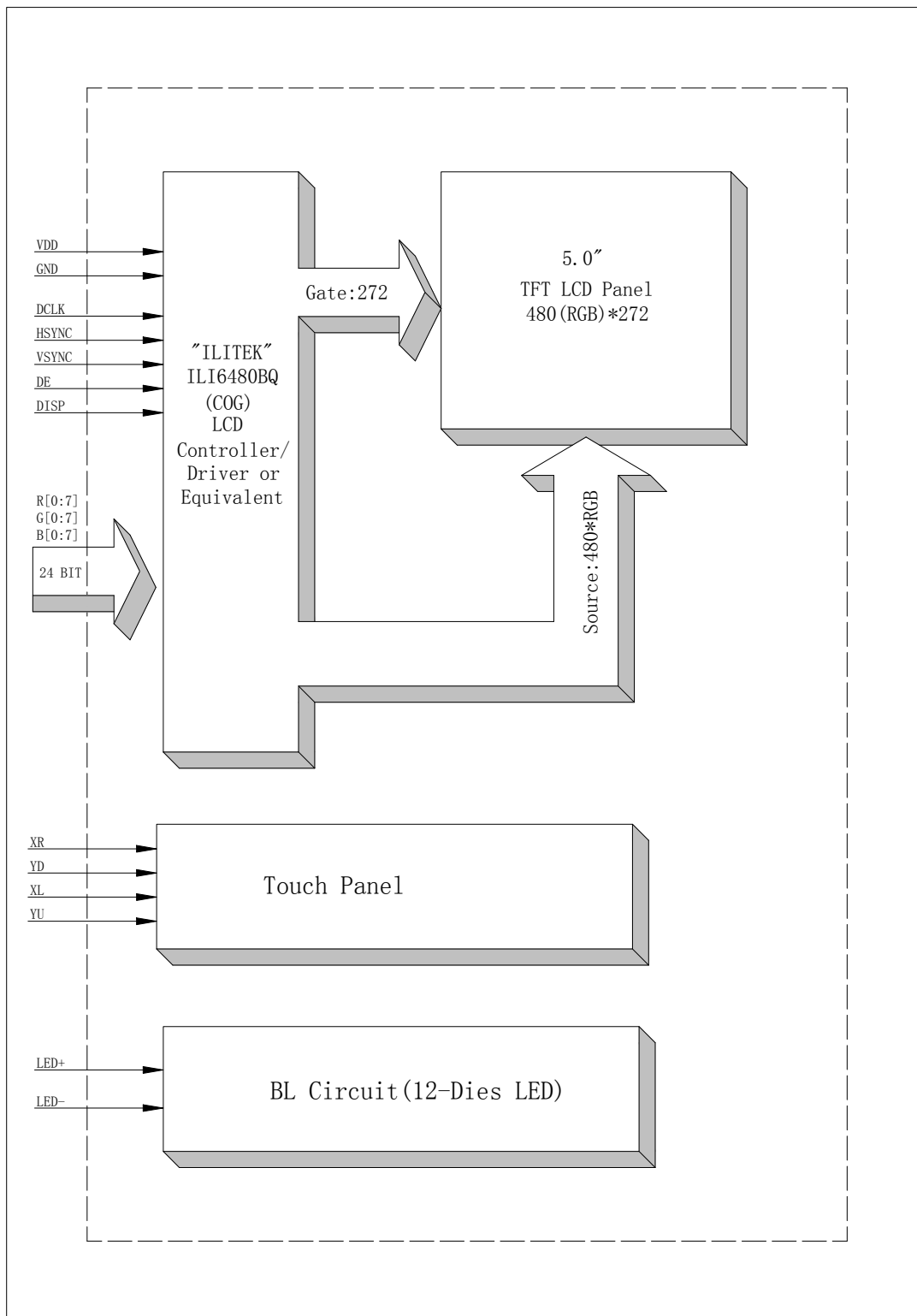
# 1. General Specification

<b>Item</b>	<b>Contents</b>	<b>Unit</b>
LCD TYPE	TFT/TRANSMISSIVE	
MODULE SIZE (W*H*T)	120.70*75.80*4.10	MM
ACTIVE SIZE (W*H)	110.88*62.83	MM
PIXEL PITCH (W*H)	0.231*0.231	MM
NUMBER OF DOTS	480*272	
DIVER IC	ILI6480BQ	
INTERFACE TYPE	24-BIT RGB	
TOP POLARIZER TYPE	ANTI-GLARE	
RECOMMEND VIEWING DIRECTION	12	O'CLOCK
GRAY SCALE INVERSION DIRECTION	6	O'CLOCK
COLORS	16.7M	
BACKLIGHT TYPE	12-DIES WHITE LED	
TOUCH PANEL TYPE	RESISTIVE TP	

## 2. Mechanical Drawing



### 3. Block Diagram



## 4. Interface Pin Function

Pin No.	Symbol	Description
1	LED-	Cathode of LED backlight
2	LED+	Anode of LED backlight
3	GND	Power ground
4	VDD	Power voltage
5	R0	Red data (LSB)
6	R1	Red data
7	R2	Red data
8	R3	Red data
9	R4	Red data
10	R5	Red data
11	R6	Red data
12	R7	Red data (MSB)
13	G0	Green data (LSB)
14	G1	Green data
15	G2	Green data
16	G3	Green data
17	G4	Green data
18	G5	Green data
19	G6	Green data
20	G7	Green data(MSB)
21	B0	Blue data(LSB)
22	B1	Blue data
23	B2	Blue data
24	B3	Blue data
25	B4	Blue data
26	B5	Blue data
27	B6	Blue data
28	B7	Blue data(MSB)
29	GND	Power ground
30	DCLK	Pixel clock
31	DISP	Display on/off
32	HSYN	Horizontal sync signal
33	VSYNC	Vertical sync signal
34	DE	Data enable
35	NC	NO connect
36	GND	Power ground
37	XR	Right electrode -differential analog
38	YD	Bottom electrode -differential analog
39	XL	Left electrode -differential analog
40	YU	Top electrode -differential analog

## 5. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply voltage for analog	VDD	-0.3	4.5	V
Supply voltage for logic	VDD	-0.3	4.5	V
Supply current (One LED)	I <sub>LED</sub>		30	mA
Operating temperature	T <sub>OP</sub>	-20	+70	°C
Storage temperature	T <sub>ST</sub>	-30	+80	°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 exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.



## 6. Electrical Characteristics

### 6.1 Input Power

Item	Symbol	Min	Typ.	Max	Unit	Applicable terminal
Supply Voltage for Analog	VDD	3.0	3.3	3.6	V	
Supply Voltage for Logic	VDD	3.0	3.3	3.6	V	
Input Voltage	V <sub>IL</sub>	GND	-	0.2VDD	V	
	V <sub>IH</sub>	0.8 VDD	-	VDD		
Input leakage Current	I <sub>LKG</sub>	-		-	μA	

### 6.2 Backlight Driving Conditions

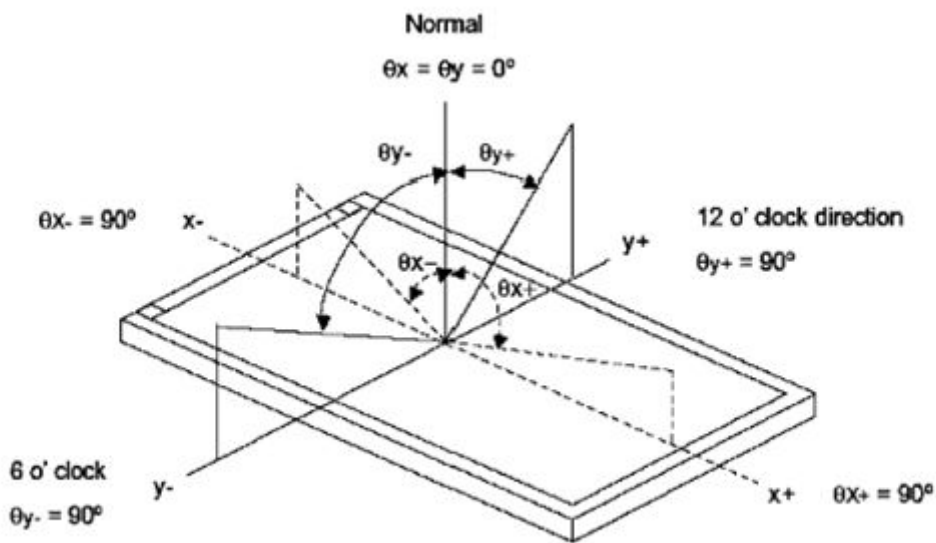
Item	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V <sub>F</sub>	-	19.2	-	V	I <sub>L</sub> =40mA
Current for LED Backlight	I <sub>L</sub>		40		mA	
Power Consumption	P		0.768		W	
LED Life Time		30,000			Hr	Note

Note: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25°C

## 7. Optical Characteristics

ITEM	SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
			MIN	TYP.	MAX		
Luminance	L	$I_L = 40\text{mA}$		300		$\text{Cd/m}^2$	
Contrast Ratio	CR	$\theta = 0^\circ$	400	500			
Response Time	$T_{\text{ON}}$	$25^\circ\text{C}$		35		ms	
	$T_{\text{OFF}}$						
CIE Color Coordinate	Red	$X_R$	Viewing normal angle				
		$Y_R$					
	Green	$X_G$					
		$Y_G$					
	Blue	$X_B$					
		$Y_B$					
	White	$X_W$			0.270		
		$Y_W$			0.290		
Viewing Angle	Hor.	$\theta_{X+}$	$CR \geq 10$	60	70	Degree	
		$\theta_{X-}$		60	70		
	Ver.	$\theta_{Y+}$		40	50		
		$\theta_{Y-}$		60	70		
Uniformity	Un			70	75	%	

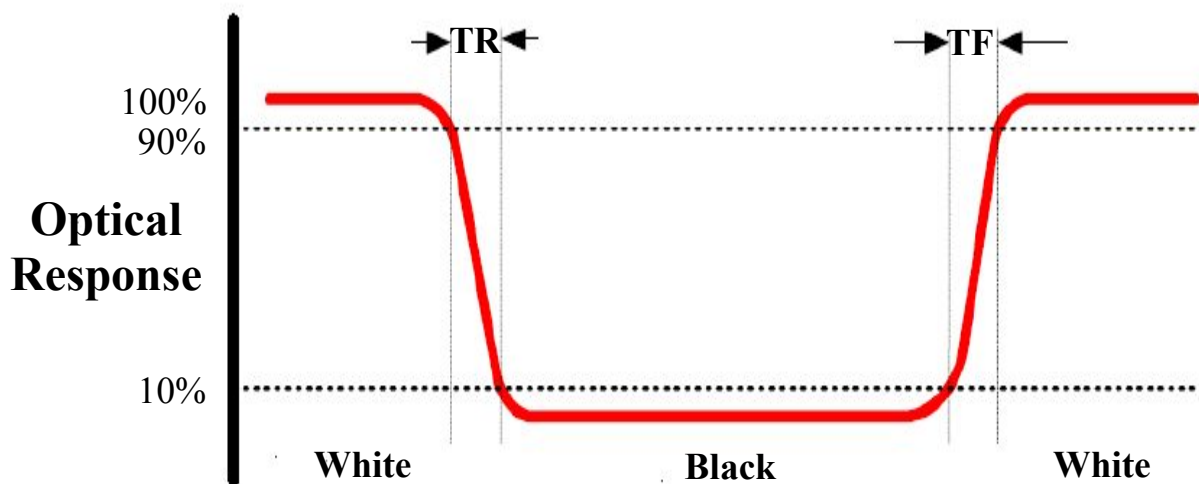
**Note 1: Definition of Viewing Angle  $\theta_x$  and  $\theta_y$ :**



**Note 2: Definition of contrast ratio CR:**

$$CR = \frac{\text{Luminance of white state}}{\text{Luminance of black state}}$$

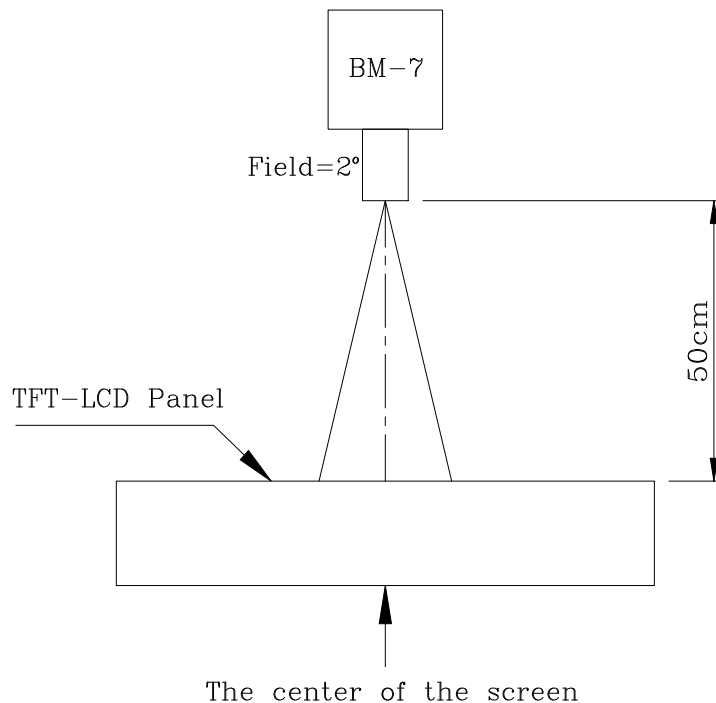
**Note 3: Definition of Response Time ( $T_r, T_f$ )**



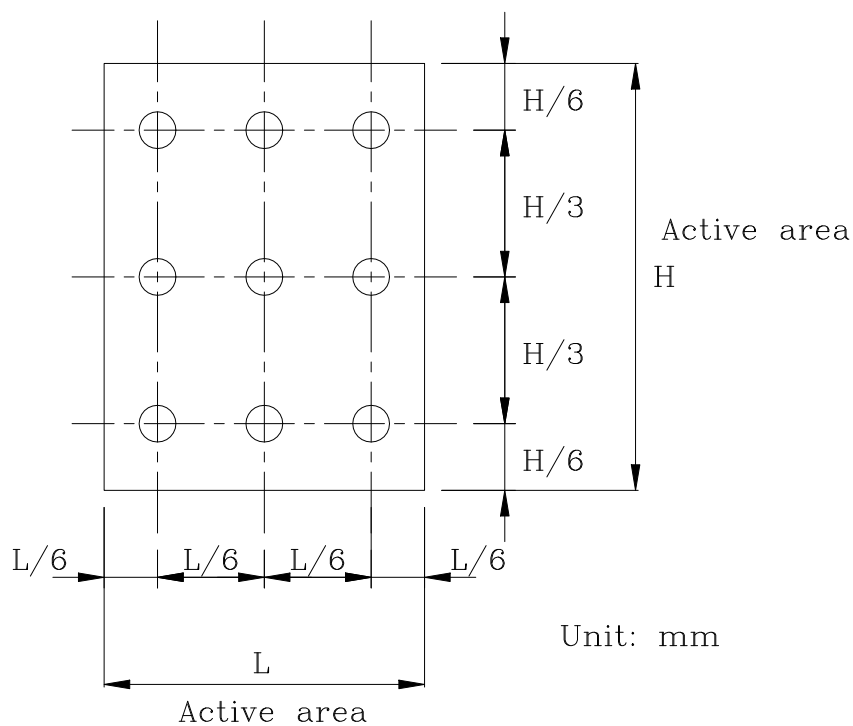
## Note 4: Definition of Luminance

### ①The Brightness Test Equipment Setup

Field=2° (As measuring “black” image, field=2° is the best testing condition)

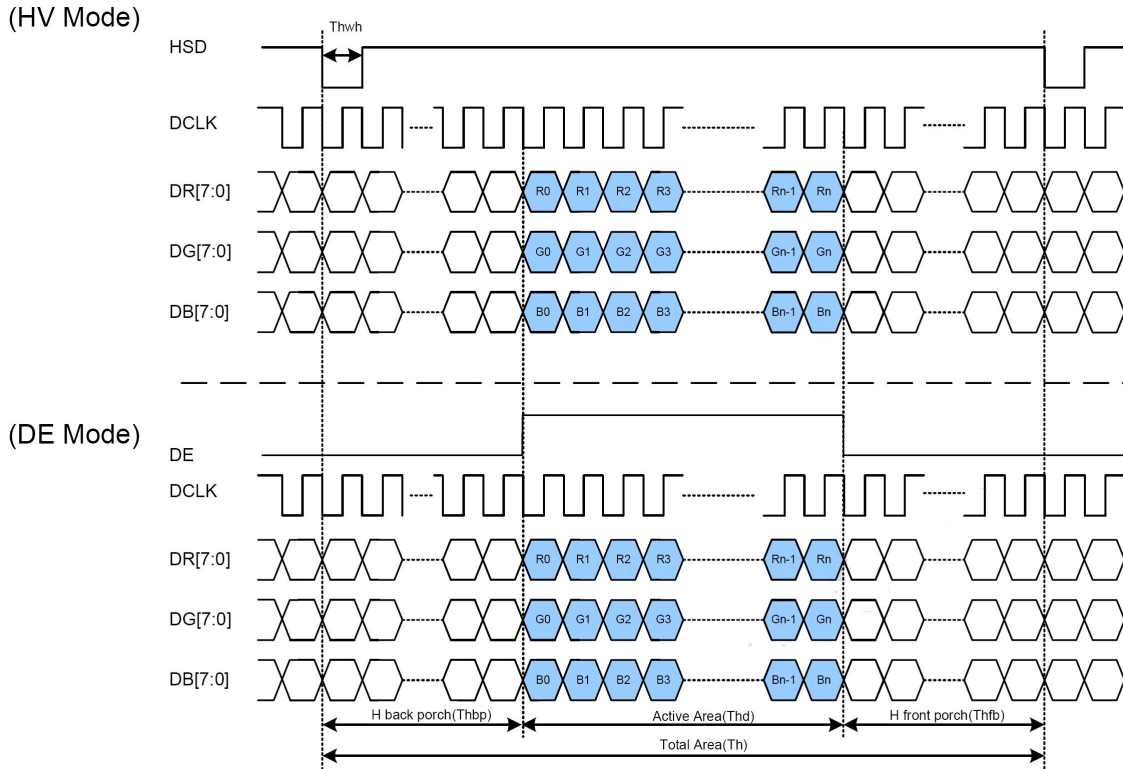


### ②The Brightness Test Point Setup



# 8. Timing Characteristics

## 8.1 Parallel RGB Mode Timing Diagram

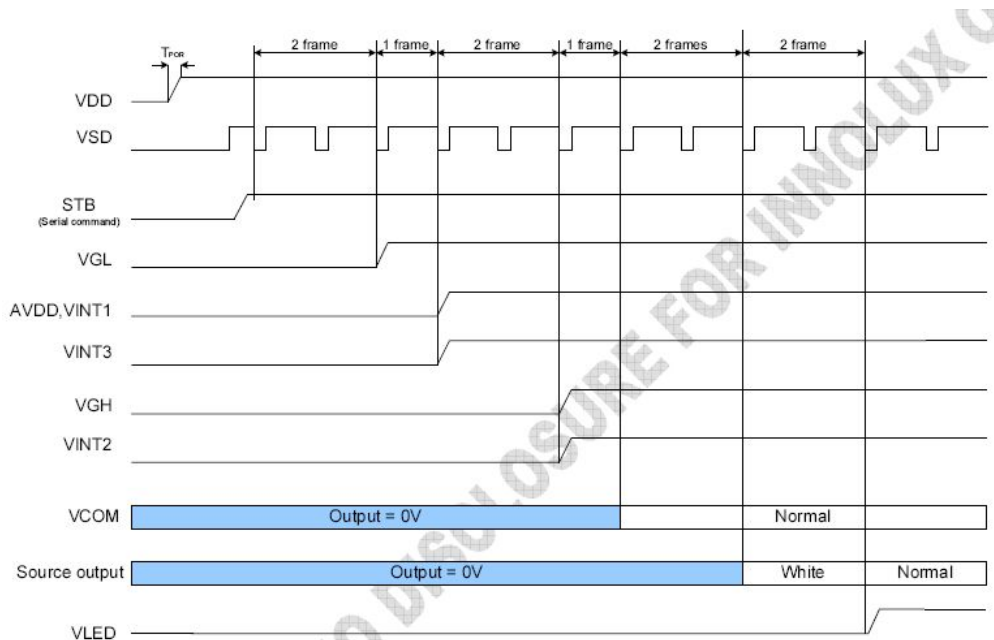


## 8.2 Parallel RGB Timing Table

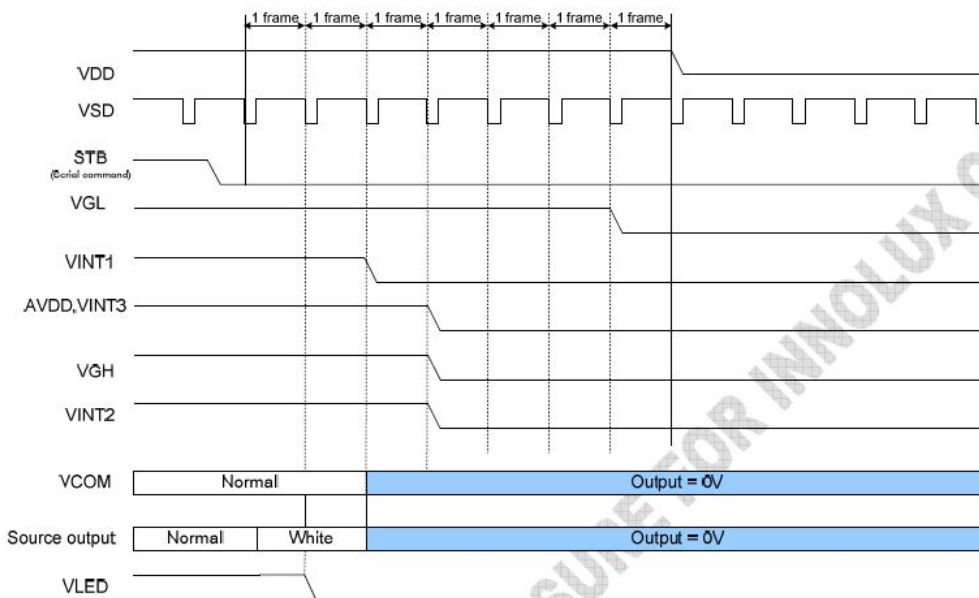
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	5	9	12	MHz
VSD period time	$T_v$	277	288	400	H
VSD display area	$T_{vd}$	272			H
VSD back porch	$T_{vb}$	3	8	31	H
VSD front porch	$T_{vfp}$	2	8	97	H
HSD period time	$T_h$	520	525	800	DCLK
HSD display area	$T_{hd}$	480			DCLK
HSD back porch	$T_{hbp}$	36	40	255	DCLK
HSD front porch	$T_{hfp}$	4	5	65	DCLK

## 8.3 Power ON/OFF Sequence

### Power on



### Power off



## 9. Standard Specification for Reliability

### 9.1 Standard Specification for Reliability of LCD Module

Item	Test Conditions	Remark
High temperature storage	Ta=80°C 240hrs	NOTE1 , NOTE4
Low temperature storage	Ta=-30°C 240hrs	NOTE1 , NOTE4
High temperature operation	Ta=70°C 240hrs	NOTE2 , NOTE4
Low temperature operation	Ta=-20°C 240hrs	NOTE2 , NOTE4
Operate at high temperature and humidity	+60°C, 90%RH 240hrs	NOTE4
Thermal Shock	-30°C/30min~+80°C/30min for a total 100 cycles, start with cold temperature and end with high temperature.	NOTE4
Vibration Test	Frequency range:10~55HZ Stroke:1.5mm Swap:10HZ~55HZ~10HZ 2 hours of 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 :0.15G*G/HZ from 5-200 HZ,-6dB/Octave from 200-500HZ of each direction of X.Y. Z (6 hours for total)	
Low temperature storage	Height:60cm 1 corner ,3 edges ,6 surfaces	
Low temperature storage	±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.

## 10. General Precautions

### 10.1. 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.

### 10.2. Handling

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

### 10.3. Static Electricity

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

### 10.4. Storage

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

### 10.5. Cleaning

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

## 11. Packing Method

----TBD