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CERT. No.: 282Q19070712006



CERT. No.: 282E19070712007

## Product Specification

**Model: TTG104BVH-01**

**10.4" TFT Display Module(720\*1600)**

This module uses RoHS material

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## **DOCUMENT REVISION HISTORY**

<b>Version</b>	<b>DATE</b>	<b>DESCRIPTION</b>	<b>CHANGED BY</b>
V00	2023.10.19	New design	

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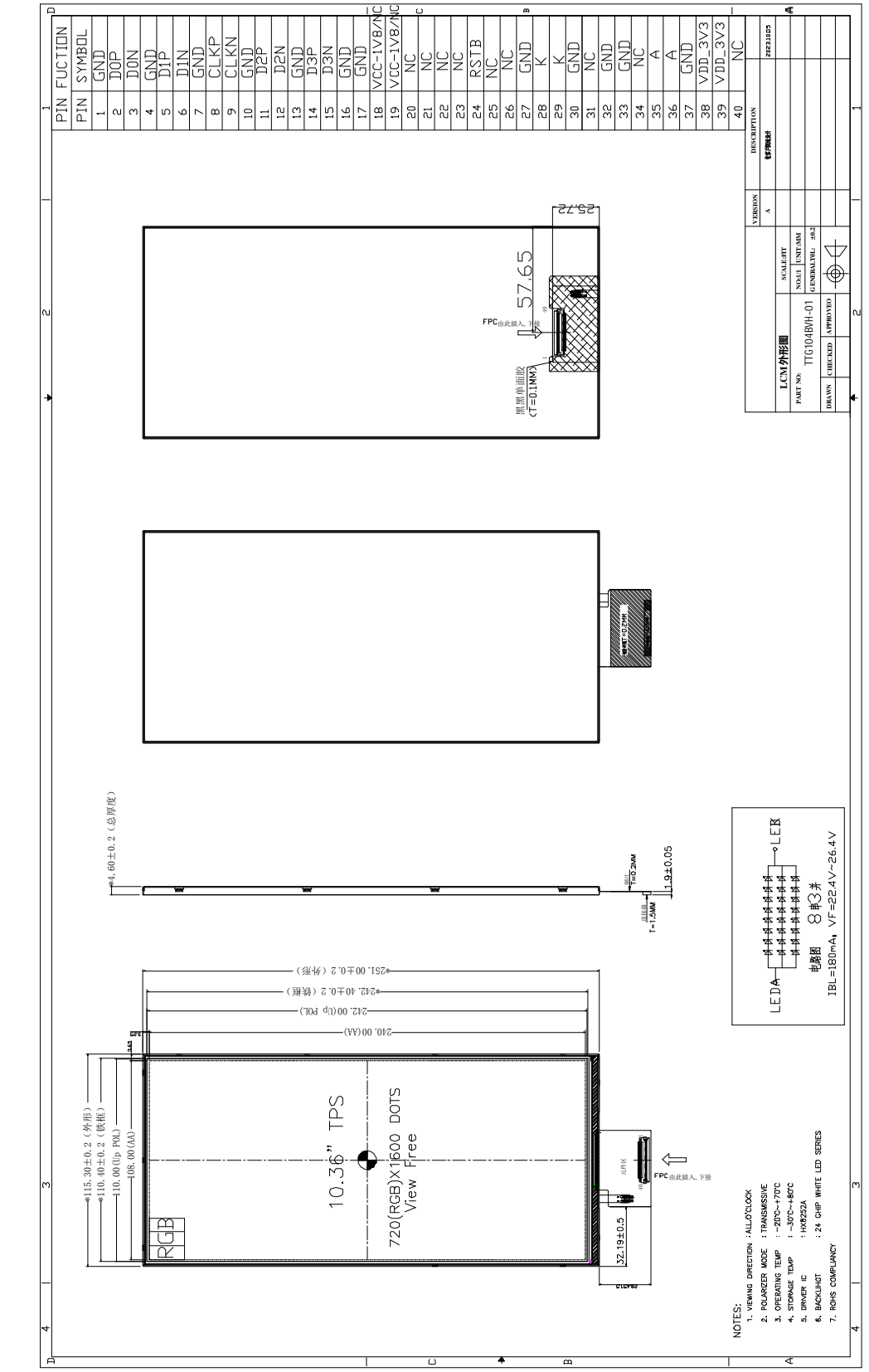
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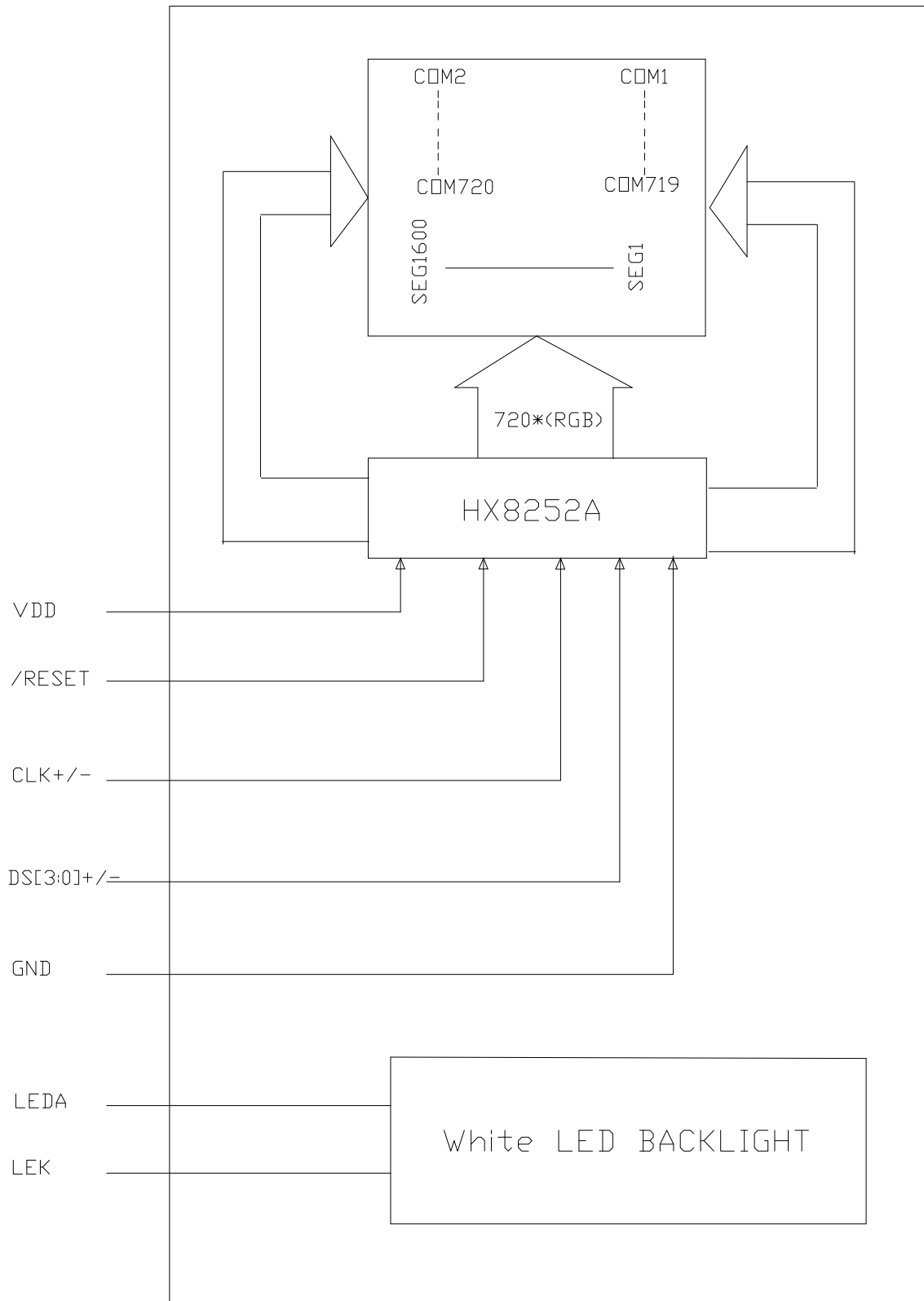
## A. Features & Mechanical Specifications

Item	Contents	Unit
	LCD	
<b>LCD Type</b>	TFT Transmissive Normal <b>Black</b>	--
<b>Viewing direction</b>	ALL.O'CLOCK	--
<b>Backlight</b>	White LED	--
<b>Interface</b>	MIPI 4 Lanes	--
<b>Driver IC</b>	HX8252A	--
<b>Outline Dimension</b>	115.3*251*4.6±0.2	mm
<b>Glass area (W×H×T)</b>	113*248.5*0.8	mm
<b>Active area (W×H)</b>	108*240	mm
<b>Number of Dots</b>	720*1600	--
<b>Pixel pitch</b>	0.15(H)*0.15(V)	mm
<b>Operating Temperature</b>	-20 ~ +70	℃
<b>Storage temperature</b>	-30 ~ +80	℃

## B. Dimensional Outline



## C. Block Diagram



#### 4. Pin Description

PIN No.	SYMBOL	Function
1	GND	Ground
2	DSI-D0P	DSI Data differential signal input pins. (Data lane0)
3	DSI-D0N	DSI Data differential signal input pins. (Data lane 0)
4	GND	Ground
5	DSI-D1P	DSI Data differential signal input pins. (Data lane 1)
6	DSI-D1N	DSI Data differential signal input pins. (Data lane 1)
7	GND	Ground
8	DSI-CLK P	DSI CLOCK differential signal input pins
9	DSI-CLK N	DSI CLOCK differential signal input pins
10	GND	Ground
11	DSI-D2P	DSI Data differential signal input pins. (Data lane 2)
12	DSI-D2N	DSI Data differential signal input pins. (Data lane 2)
13	GND	Ground
14	DSI-D3P	DSI Data differential signal input pins. (Data lane 3)
15	DSI-D3N	DSI Data differential signal input pins. (Data lane 3)
16-17	GND	Ground
18-19	IOVCC/NC	NC
20-23	NC	NC
24	RESET	Reset Signal pin (“Low” is enable)(2.8-3.3V)
25-26	NC	NC
27	GND	Ground
28-29	LEDK	Backlight LED Cathode
30	GND	Ground
31	NC	NC

32-33	GND	Ground
34	NC	NC
35-36	LEDA	Backlight LED Anode.
37	GND	Ground
38-39	VCC	Logic Power supply(2.8-3.3V)
40	NC	NC

## 5. Absolute Maximum Ratings

Item	Symbol	Rating			Unit
		MIN.	TYP.	MAX	
Operating Temperature range	T <sub>OP</sub>	-20	-	+70	°C
Storage Temperature range	T <sub>ST</sub>	-30	-	+80	°C

## 6. Electrical Characteristics

### DC Characteristics

Item	Symbol	Min.	Type.	Max.	Unit
I/O Supply Voltage	VDD	2.8	-	3.3	V

**注：没有 IOVCC 时，复位电压需与 VCC 保持一致**

## 7. Backlight Characteristics

White LED × 24n Parallel/ Series

(T<sub>a</sub> = 25°C)

Item	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =180mA	22.4	-	26.4	V
Uniformity	△B <sub>p</sub>	-	80	-	-	%
Luminance for LCD	L <sub>v</sub>	I <sub>F</sub> =180mA	500	550	600	cd/m <sup>2</sup>

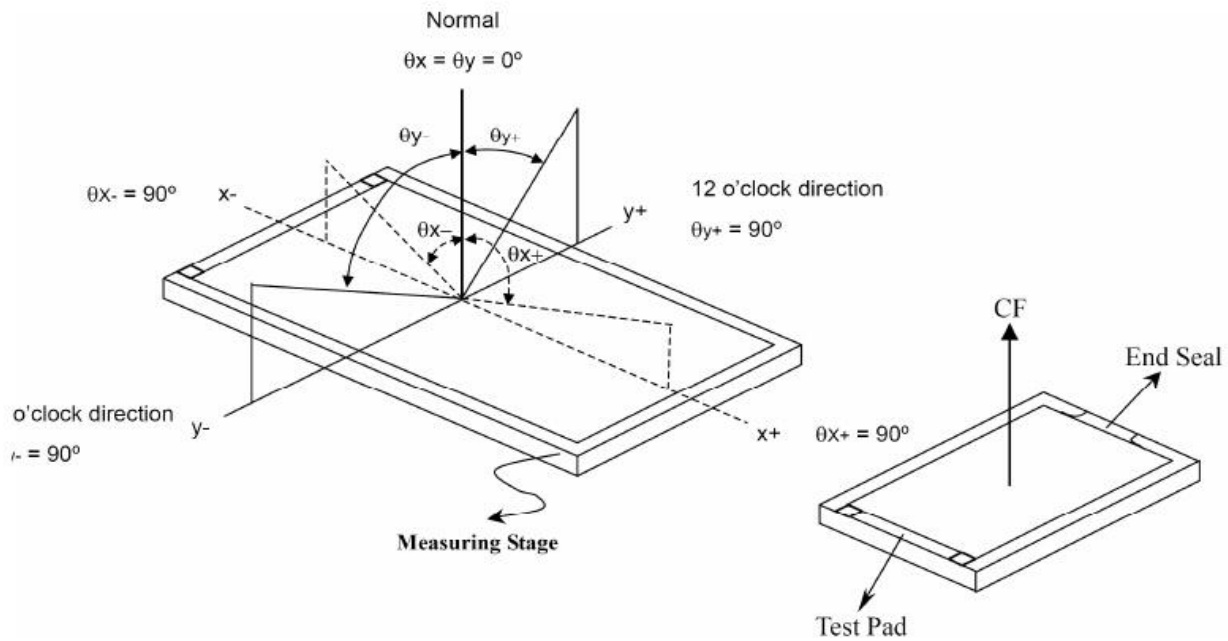


## 8. Electro-Optical Characteristics

Using LC+ Normal Polarizer+Corresponding Backlight, reference only (Note 1,Note 2)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	$\Theta_3$	CR > 10	-	80	-	Deg.	Note 1
		$\Theta_9$		-	80	-	Deg.	
	Vertical	$\Theta_{12}$		-	80	-	Deg.	
		$\Theta_6$		-	80	-	Deg.	
Contrast ratio		CR	$\Theta = 0^\circ$	-	800	-		Note 2
Transmittance		Tr		-	4.5	-	%	Base on C Light Note 3
White Chromaticity		$x_w$		-	0.298	-		Note 4 CF Glass Base on C Light
		$y_w$		-	0.328	-		
Reproduction of color (C light)	Red	$R_x$		-	0.659	-		
		$R_y$		-	0.322	-		
	Green	$G_x$		-	0.290	-		
		$G_y$		-	0.588	-		
	Blue	$B_x$		-	0.134	-		
		$B_y$		-	0.124	-		
Response Time (Rising + Falling)		$T_r + T_f$	Ta= 25° C $\Theta = 0^\circ$	-	30	35	ms	Note 5

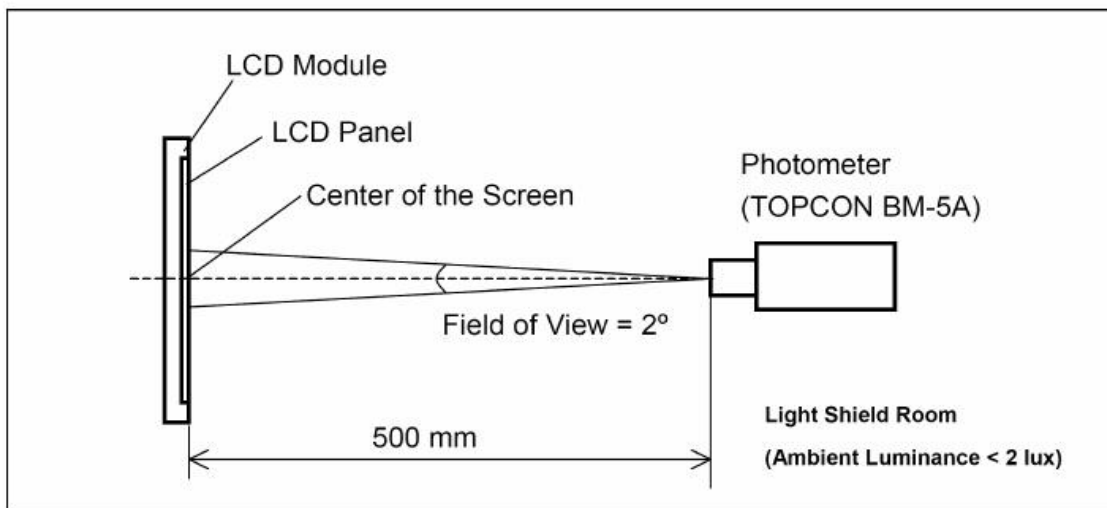
\*Note(3) Definition of Viewing Angle



\*\*\* The above "Viewing Angle" is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is 6 O'clock. Module maker can increase the "Viewing Angle" by applying Wide View Film.

\*Note (4) Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



## 9. Instruction Description

Please refer to IC HX8252A

## 10. AC Characteristics

### 13.1 MIPI AC characteristics

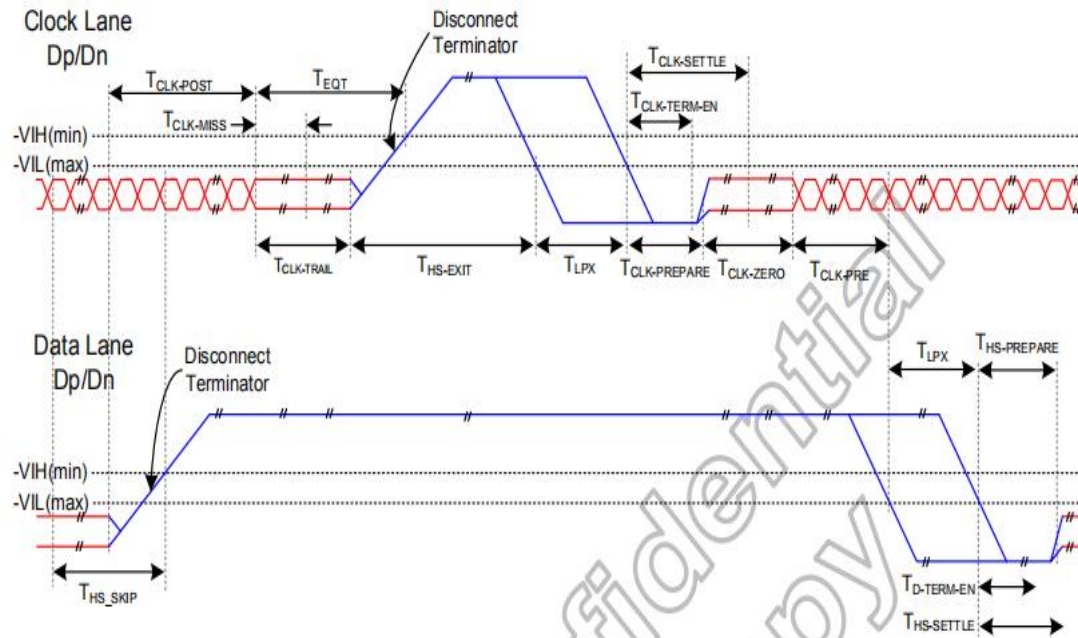


Figure 13.1: Switching the clock lane between clock transmission and low-power mode

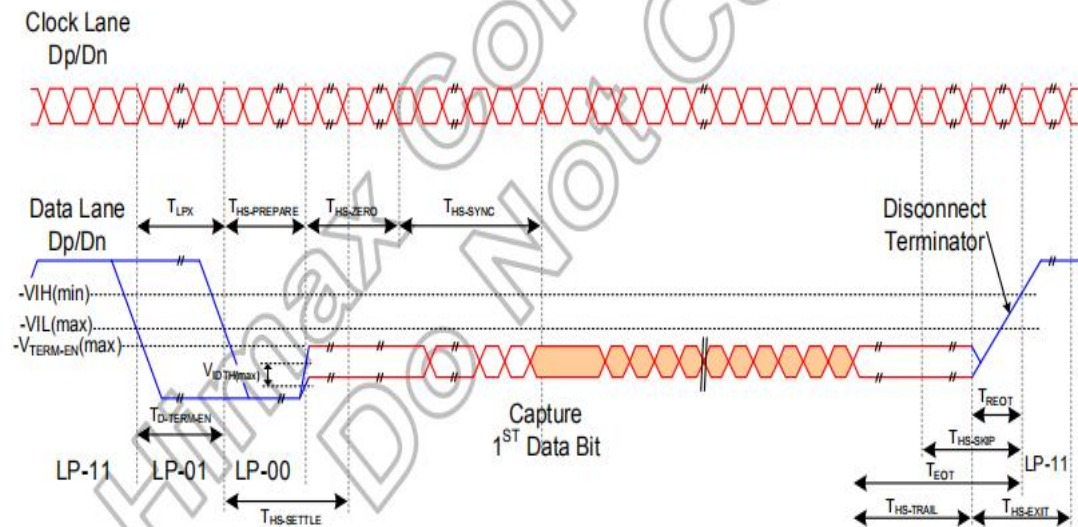


Figure 13.2: Timing of high-speed data transmission in bursts

## 11. Reliability of LCM

Reliability test condition:

Item	Condition	Time (hrs)	Assessment
High temp. Storage	80°C	48	No abnormalities in functions and appearance
High temp. Operating	70°C	48	
Low temp. Storage	-30°C	48	
Low temp. Operating	-20°C	48	
Humidity	60°C/ 90%RH	48	
Temp. Cycle	-20°C ← 25°C → 70°C (60 min ← 5 min → 60min)	10cycles	
Electro Static Discharge(Operation)	C=150pF,R=330 Ω ,5points/panel Air:±8KV;Contrct:±4KV	5times	

Recovery time should be 24 hours minimum. Moreover, functions, performance and appearance shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature ( $20\pm 8^{\circ}\text{C}$ ), normal humidity (below 65% RH), and in the area not exposed to direct sun light.

## 12. Precaution for using LCD/LCM

LCD/LCM is assembled and adjusted with a high degree of precision. Do not attempt to make any alteration or modification. The followings should be noted.

### General Precautions:

- D. LCD panel is made of glass. Avoid excessive mechanical shock or applying strong pressure onto the surface of display area.
- E. The polarizer used on the display surface is easily scratched and damaged. Extreme care should be taken when handling. To clean dust or dirt off the display surface, wipe gently with cotton, or other soft material soaked with isopropyl alcohol, ethyl alcohol or trichlorotrifluoroethane, do not use water, ketone or aromatics and never scrub hard.
- F. Do not tamper in any way with the tabs on the metal frame.
- G. Do not make any modification on the PCB without consulting SUNYEE.
- H. When mounting a LCM, make sure that the PCB is not under any stress such as bending or twisting. Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.
- I. Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels and also cause rainbow on the display.
- J. Be careful not to touch or swallow liquid crystal that might leak from a damaged cell. Any liquid crystal adheres to skin or clothes, wash it off immediately with soap and water.

### Static Electricity Precautions:

- K. CMOS-LSI is used for the module circuit; therefore operators should be grounded whenever he/she comes into contact with the module.
- L. Do not touch any of the conductive parts such as the LSI pads; the copper leads on the PCB and the interface terminals with any parts of the human body.
- M. Do not touch the connection terminals of the display with bare hand; it will cause disconnection or defective insulation of terminals.
- N. The modules should be kept in anti-static bags or other containers resistant to static for storage.
- O. Only properly grounded soldering irons should be used.
- P. If an electric screwdriver is used, it should be grounded and shielded to prevent sparks.
- Q. The normal static prevention measures should be observed for work clothes and working benches.
- R. Since dry air is inductive to static, a relative humidity of 50-60% is recommended.

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### **Soldering Precautions:**

- S. Soldering should be performed only on the I/O terminals.
- T. Use soldering irons with proper grounding and no leakage.
- U. Soldering temperature:  $280^{\circ}\text{C} \pm 10^{\circ}\text{C}$
- V. Soldering time: 3 to 4 second.
- W. Use eutectic solder with resin flux filling.
- X. If flux is used, the LCD surface should be protected to avoid spattering flux.
- Y. Flux residue should be removed.

### **Operation Precautions:**

- Z. The viewing angle can be adjusted by varying the LCD driving voltage  $V_o$ .
- AA. Since applied DC voltage causes electro-chemical reactions, which deteriorate the display, the applied pulse waveform should be a symmetric waveform such that no DC component remains. Be sure to use the specified operating voltage.
- AB. Driving voltage should be kept within specified range; excess voltage will shorten display life.
- AC. Response time increases with decrease in temperature.
- AD. Display color may be affected at temperatures above its operational range.
- 6. Keep the temperature within the specified range usage and storage. Excessive temperature and humidity could cause polarization degradation, polarizer peel-off or generate bubbles.
- 7. For long-term storage over  $40^{\circ}\text{C}$  is required, the relative humidity should be kept below 60%, and avoid direct sunlight.

### **Limited Warranty**

SUNYEE LCDs and modules are not consumer products, but may be incorporated by SUNYEE's customers into consumer products or components thereof, SUNYEE does not warrant that its LCDs and components are fit for any such particular purpose.

- AE. The liability of SUNYEE is limited to repair or replacement on the terms set forth below. SUNYEE will not be responsible for any subsequent or consequential events or injury or damage to any personnel or user including third party personnel and/or user. Unless otherwise agreed in writing between SUNYEE and the customer, SUNYEE will only replace or repair any of its LCD which is found defective electrically or visually when inspected in accordance with SUNYEE general LCD inspection standard. (Copies available on request)
- AF. No warranty can be granted if any of the precautions state in handling liquid crystal display above has been disregarded. Broken glass, scratches on polarizer mechanical damages as well as defects that are caused accelerated environment tests are excluded from warranty.
- AG. In returning the LCD/LCM, they must be properly packaged; there should be detailed description of the failures or defect.