SPECIFICATION FOR

Module:YS-T101009 V2.0

Designed by	R&D Checked by	Quality Department by	Approved by

Approval by Customer:

OK

NG, Problem survey

Approved By_____

Revision Record

REV NO.	REV DATE	Contents Before Change	Contents After Change	Note
V1.0	2022/03/10	NEW ISSUE PAN		
V2.0	2022/11/23		优化更新图纸	

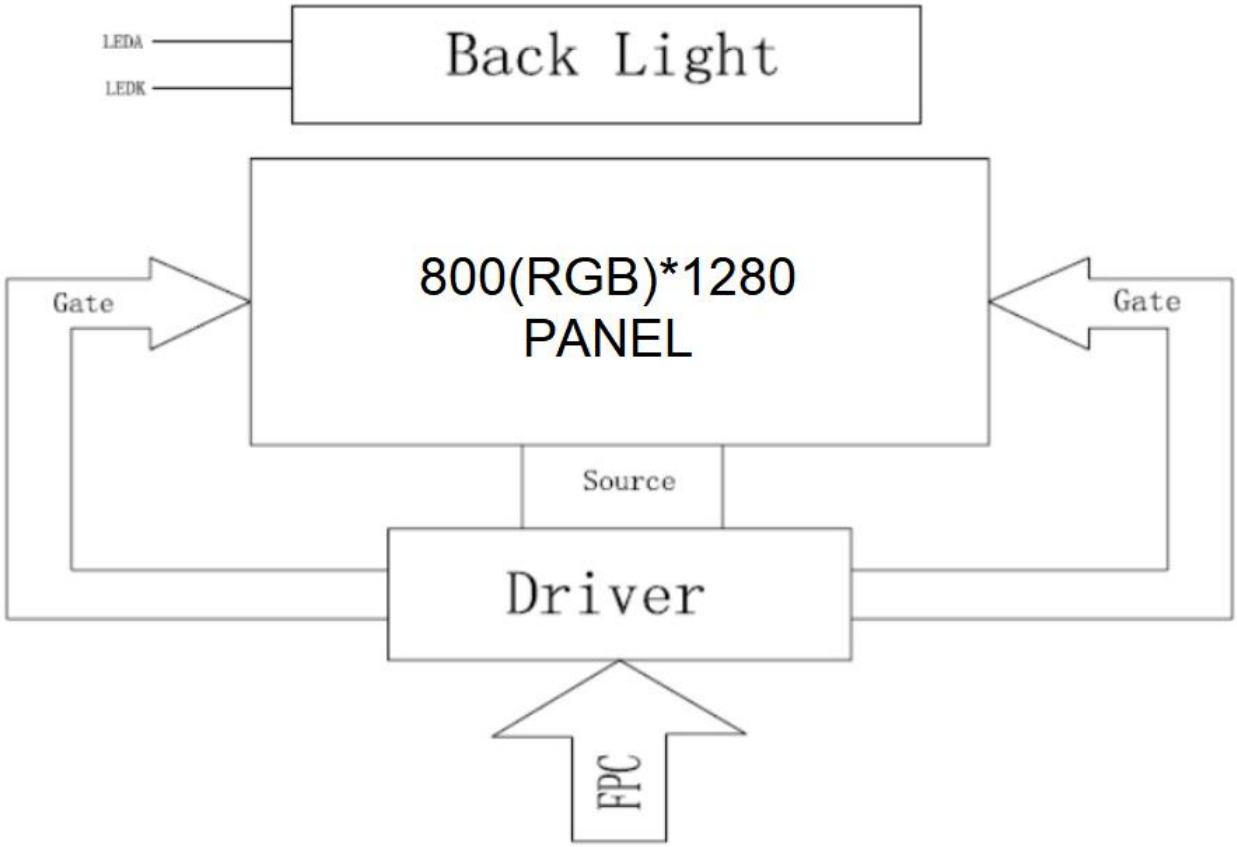
Contents

1. Technical parameters

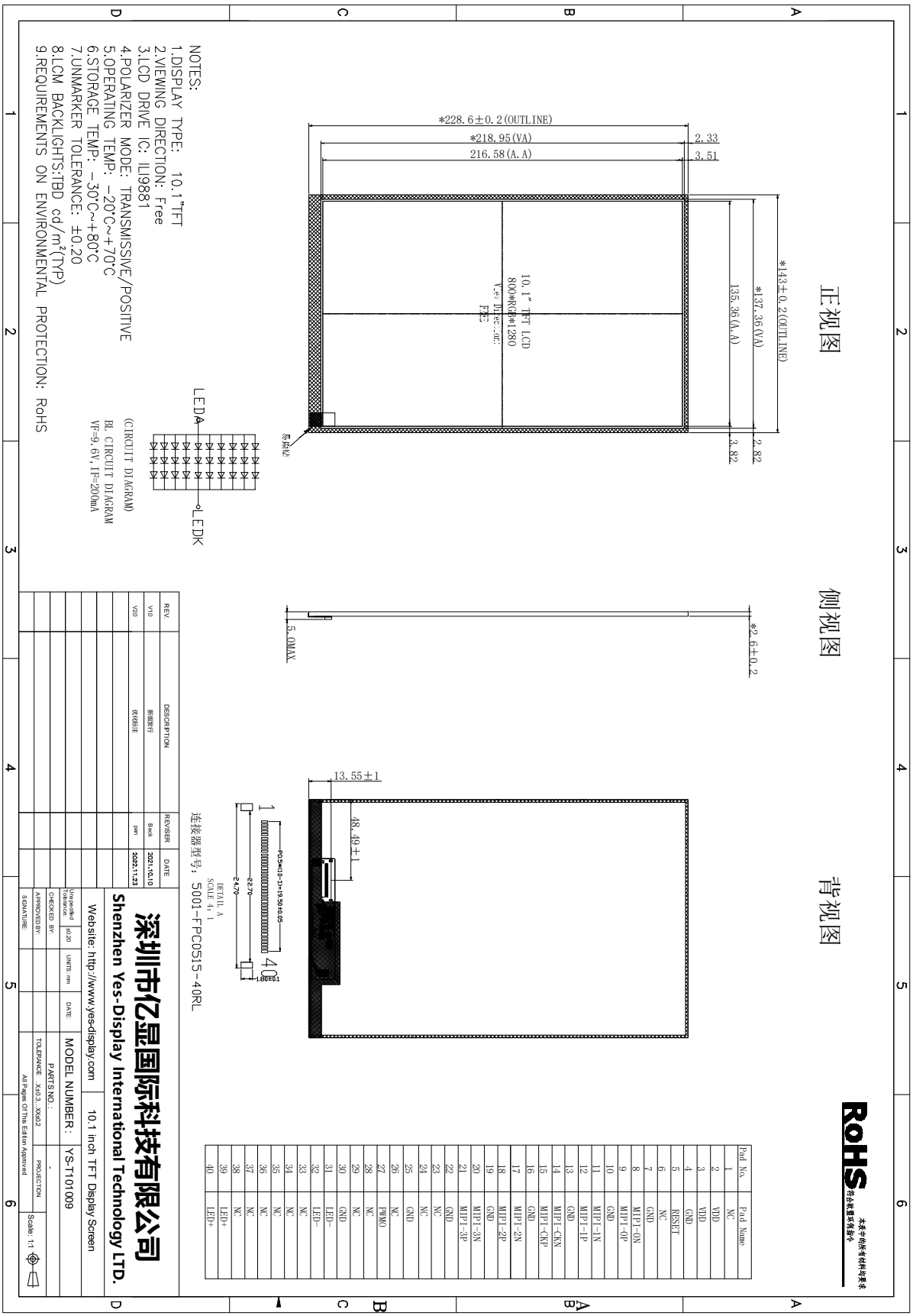
1.1 LCM General Information

ITEM	STANDARD VALUES	UNITS
LCD type	10.1TFT	--
Dot arrangement	800(RGB)×1280	dots
Color filter array	RGB vertical stripe	--
Display mode	IPS/ Transmission / Normally Black	-
Eyes Viewing Direction	ALL	--
Driver IC	TBD	--
Module size	143.00(W)×228.60(H)×2.60(T)(Include PCB)	mm
Active area	135.36(W)×216.58(H)	mm
Interface	4 MIPI	--
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Back Light	White LED 3*10	--

2. Block Dimension



3. Outline Dimensions



Pad No.	Pad Name
1	NC
2	VDD
3	VDD
4	GND
5	RESET
6	NC
7	GND
8	MIPI-0N
9	MIPI-0P
10	GND
11	MIPI-1N
12	MIPI-1P
13	GND
14	MIPI-CKN
15	MIPI-CKP
16	GND
17	MIPI-2N
18	MIPI-2P
19	GND
20	MIPI-3N
21	MIPI-3P
22	GND
23	NC
24	NC
25	GND
26	NC
27	PWMO
28	NC
29	NC
30	GND
31	LED-
32	LED-
33	NC
34	NC
35	NC
36	NC
37	NC
38	NC
39	LED+
40	LED+

4. Input terminal Pin Assignment Description

4.1 TFT Pin Description

PIN NO.	PIN NAME	DESCRIPTION
1	NC	NC
2-3	VDD	Power Voltage for digital circuit 3.3V
4	GND	Ground for logic.
5	RESET	Reset signal input terminal, active at 'L'.
6	NC	NC
7	GND	Ground for logic.
8	D0N	DATA0- differential data signals.
9	D0P	DATA0+ differential data signals.
10	GND	Ground for logic.
11	D1N	DATA1- differential data signals.
12	D1P	DATA1+ differential data signals.
13	GND	Ground for logic.
14	CLKN	CLK- differential clock signals.
15	CLKP	CLK+ differential clock signals
16	GND	Ground for logic.
17	D2N	DATA2- differential data signals.
18	D2P	DATA2+ differential data signals.
19	GND	Ground for logic.
20	D3N	DATA3- differential data signals.
21	D3P	DATA3+ differential data signals.
22	GND	Ground for logic.
23-24	NC	NC
25	GND	Ground for logic.
26	NC	NC
27	PWMO	PWM control signal for LED driver(CABC)
28-29	NC	NC

30	GND	System power ground.
31-32	LEDK	Power supply for backlight cathode input terminal.
33-38	NC	NC
39-40	LEDA	Power supply for backlight anode input terminal.

5. LCD Optical Characteristics

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	70	80	-	Deg.	
		Θ_9		70	80	-	Deg.	
	Vertical	Θ_{12}		70	80	-	Deg.	
		Θ_6		70	80	-	Deg.	
Luminance Contrast ratio		CR	Θ = 0°	800	1000	-		
Cell Transmittance		Tr		-	6.1%	-	%	@Silicate BLU no APF, no Haze, no CG
White Chromaticity		x	CIE 1931	0.287	0.302	0.317		CF @ C Light
		y		0.325	0.340	0.355		
Red Chromaticity		x	CIE 1931	0.630	0.645	0.660		
		y		0.309	0.324	0.339		
Green Chromaticity		x	CIE 1931	0.293	0.308	0.323		
		y		0.564	0.579	0.594		
Blue Chromaticity		x	CIE 1931	0.131	0.146	0.161		
		y		0.132	0.147	0.162		
Color Gamut (C light)				55	60	-	%	
Response Time (Rising + Falling)		T_{RT}	Ta= 25° C Θ = 0°	-	30	-	ms	

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see FIGURE 4).

2. Contrast measurements shall be made at viewing angle of Θ= 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 . (see FIGURE 1) Luminance Contrast Ratio (CR) is defined mathematically.

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

3. Transmittance is the Value with Polarizer

4. The color chromaticity coordinates specified in Table 5 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

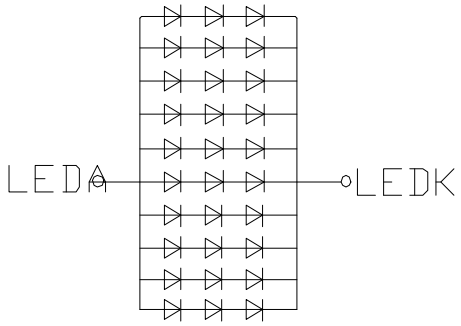
5. The electro-optical response time measurements shall be made as FIGURE 3 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.

6. TFT Electrical Characteristics

6.1 Absolute Maximum Ratings

Item	Symbol	Values		Unit
		Min.	Max.	
Power Voltage	VDD	-0.3	+5.0	V
Backlight forward current	I_{LED}	0	25	mA(For each LED)
Input Signal Voltage	V_I	-0.3	VCC	V
Operation Temperature	T_{OP}	-10	50	℃
Storage Temperature	T_{ST}	-20	60	℃

6.2 LED Backlight Characteristics



(CIRCUIT DIAGRAM)

BL CIRCUIT DIAGRAM
VF=9.6V, IF=200mA

Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition
Supply Voltage	Vf	-	9.6	-	V	If=200mA
Supply Current	If	-	TBD	-	mA	-
Luminous Intensity for LCM	-	-	250	-	cd/m^2	If=200mA
Uniformity for LCM	-	-	80	-	%	If=200mA
Life Time	-	-	50000	-	Hr	If=200mA
Backlight Color	White					

7. Timing Characteristics

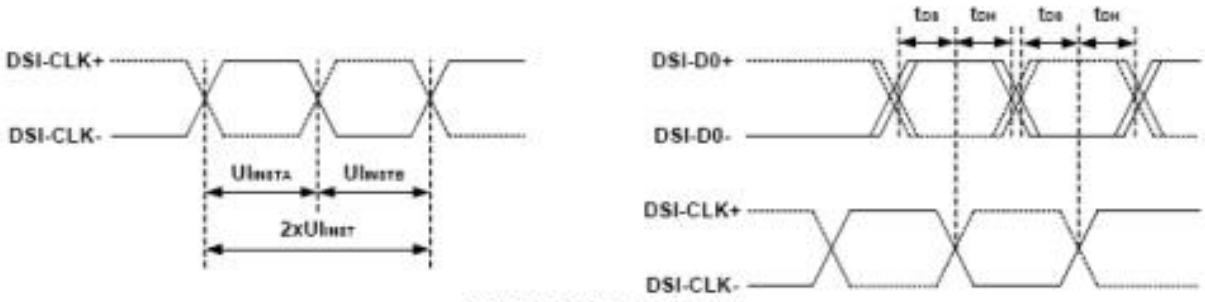
7.1 High Speed Transmission

Signal	Symbol	Parameter	MIN	TYP	MAX	Unit	Description
DSI-CLK+/-	2xUI$_{INST}$	Double UI instantaneous	4	-	8	ns	4 Lane (Note 2)
			3	-	8	ns	3 Lane (Note 2)
			2.352	-	8	ns	2 Lane (Note 3)
DSI-CLK+/-	UI$_{INSTA}$ UI$_{INSTB}$	UI instantaneous halfs (UI = UI$_{INSTA}$ = UI$_{INSTB}$)	2	-	4	ns	4 Lane (Note 2)
			1.5	-	4	ns	3 Lane (Note 2)
			1.176	-	4	ns	2 Lane (Note 3)
DSI-Dn+/-	t_{DS}	Data to clock setup time	0.15xUI	-	-	ps	
DSI-Dn+/-	t_{DH}	Data to clock hold time	0.15xUI	-	-	ps	
DSI-CLK+/-	t_{DRTCLK}	Differential rise time for clock	150	-	0.3xUI	ps	
DSI-Dn+/-	$t_{DRTDATA}$	Differential rise time for data	150	-	0.3xUI	ps	
DSI-CLK+/-	t_{DFTCLK}	Differential fall time for clock	150	-	0.3xUI	ps	
DSI-Dn+/-	$t_{DFTDATA}$	Differential fall time for data	150	-	0.3xUI	ps	

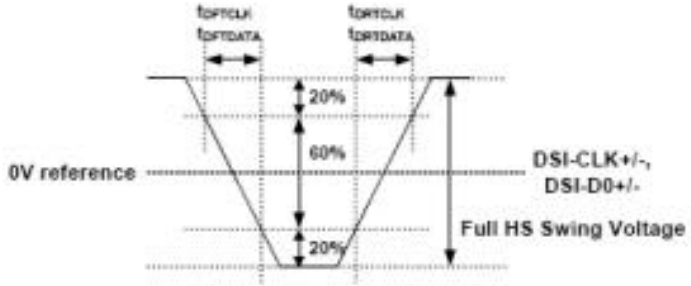
Note 1) Dn = D0, D1, D2 and D3.

Note 2) Maximum total bit rate is 2Gbps for 24-bit data format, 1.5Gbps for 18-bit data format and 1.33Gbps for 16-bit data format in 3 lanes or 4 lanes application which support to 800RGBx 1280 resolution.

Note 3) Maximum total bit rate is 1.7Gbps for 24-bit data format, 1.275Gbps for 18-bit data format and 1.13Gbps for 16-bit data format in 2 lanes application which support to 720RGBx1280 resolution.

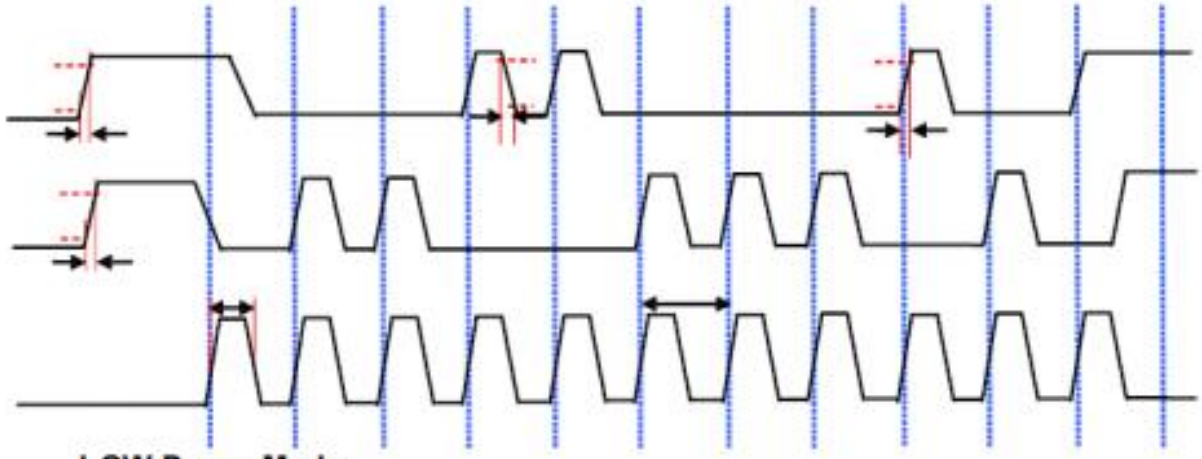


DSI clock channel timing



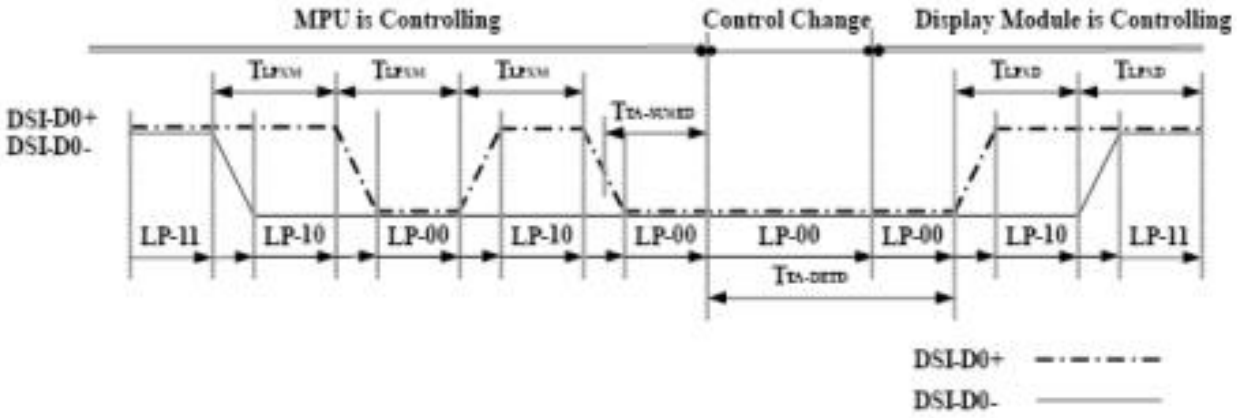
Rising and fall time on clock and data channel

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
DSI CLK frequency(LP)	F_{DSICLK_LP}			10	MHz	
DSI CLK Cycle Time(LP)	t_{CLKC_LP}	100			ns	
DSI Data Transfer Rate(LP)	t_{DSIR_LP}			10	Mbps	
15%-85% rise time and fall time	T_{RLP} / T_{FLP}	-	-	35	ns	
30%-85% rise time(from HS to LP)	T_{REOT}	-	-	35	ns	
Pulse width of the LP exclusive-OR clock	$t_{LP\text{-}PULSE\text{-}TX}$	50	65	-	ns	
Period of the LP exclusive-OR clock	$t_{LP\text{-}PRE\text{-}TX}$	100	130	-	ns	

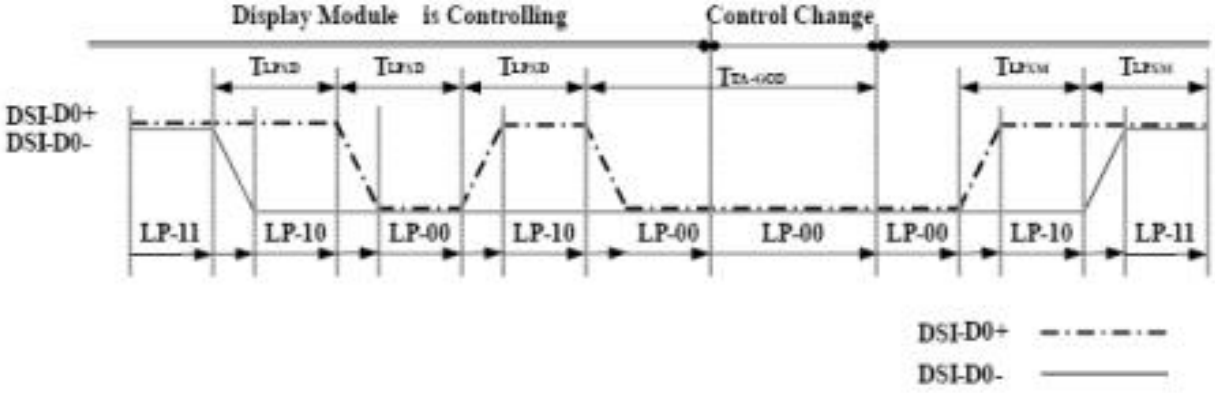


LOW Power Mode

Signal	Symbol	Parameter	MIN	TYP	MAX	Unit	Description
DSI-D0+/-	T_{LPXM}	Length of LP-00, LP-01, LP-10 or LP-11 periods MPU → Display Module	50	-	75	ns	Input
DSI-D0+/-	T_{LPXD}	Length of LP-00, LP-01, LP-10 or LP-11 periods Display Module → MPU	50	-	75	ns	Output
DSI-D0+/-	$T_{TA\text{-}SURED}$	Time-out before the MPU start driving	T_{LPXD}	-	$2xT_{LPXD}$	ns	Output
DSI-D0+/-	$T_{TA\text{-}GETD}$	Time to drive LP-00 by display module	$5xT_{LPXD}$	-	-	ns	Input
DSI-D0+/-	$T_{TA\text{-}GOD}$	Time to drive LP-00 after turnaround request - MPU	$4xT_{LPXD}$	-	-	ns	Output



Bus Turnaround (BAT) from MPU to display module Timing



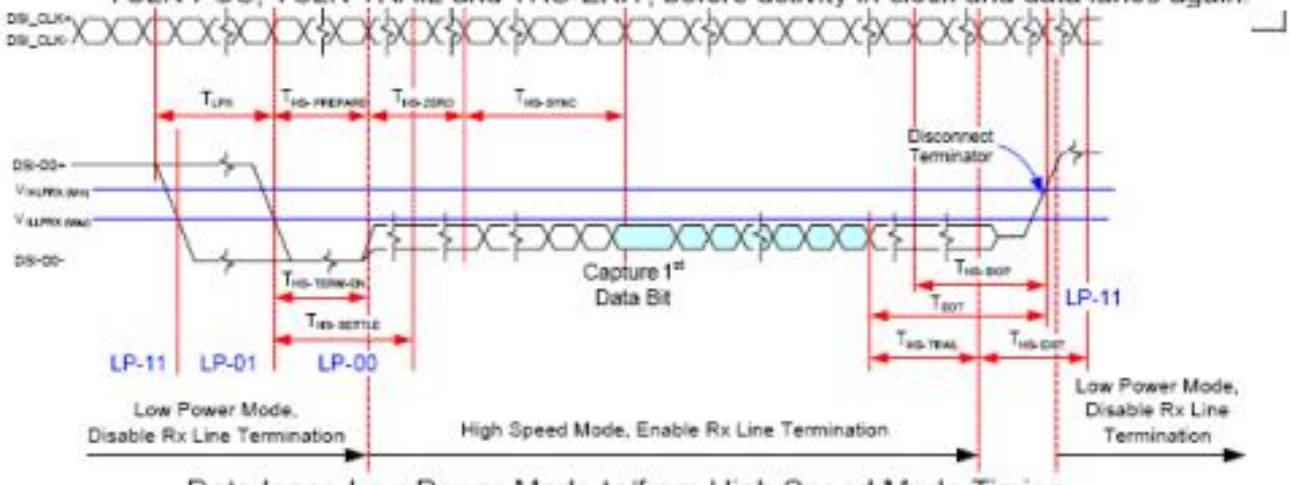
Bus Turnaround (BAT) from display module to MPU Timing

7.3 DSI Bursts

Signal	Symbol	Parameter	MIN	TYP	MAX	Unit	Description
Low Power Mode to High Speed Mode Timing							
DSI-Dn+/-	T_{LPX}	Length of any low power state period	50	-	-	ns	Input
DSI-Dn+/-	$T_{HS-PREPARE}$	Time to drive LP-00 to prepare for HS transmission	40+4xUI	-	85+6xUI	ns	Input
DSI-Dn+/-	$T_{HS-TERM-EN}$	Time to enable data receiver line termination measured from when Dn crosses V_{ILMAX}	-	-	35+4xUI	ns	Input
High Speed Mode to Low Power Mode Timing							
DSI-Dn+/-	$T_{HS-SKIP}$	Time-out at display module to ignore transition period of EoT	40	-	55+4xUI	ns	Input
DSI-Dn+/-	$T_{HS-EXIT}$	Time to drive LP-11 after HS burst	100	-	-	ns	Input
DSI-Dn+/-	$T_{HS-TRAIL}$	Time to drive flipped differential state after last payload data bit of a HS transmission burst	60+4xUI	-	-	ns	Input
High Speed Mode to/from Low Power Mode Timing							
DSI-CLK+/-	$T_{CLK-POS}$	Time that the MPU shall continue sending HS clock after the last associated data lane has transition to LP mode	60+52xUI	-	-	ns	Input
DSI-CLK+/-	$T_{CLK-TRAIL}$	Time to drive HS differential state after last payload clock bit of a HS transmission burst	60	-	-	ns	Input
DSI-CLK+/-	$T_{HS-EXIT}$	Time to drive LP-11 after HS burst	100	-	-	ns	Input
DSI-CLK+/-	$T_{CLK-PREPARE}$	Time to drive LP-00 to prepare for HS transmission	38	-	95	ns	Input
DSI-CLK+/-	$T_{CLK-TERM-EN}$	Time-out at clock lane display module to enable HS transmission	-	-	38	ns	Input

Note 1) Dn = D0, D1, D2 and D3.

Note 2) Two HS transmission can be sent with a break as short as THS-EXIT from each other in continuous clock mode. In discontinuous mode, the break is longer which account TCLK-POS, TCLK-TRAIL and THS-EXIT, before activity in clock and data lanes again.



Data lanes-Low Power Mode to/from High Speed Mode Timing

8. Inspection Standard

8.1 Incoming Inspection and Standard:

The below incoming inspection are applied to the TFT LCM Modules supplied by ShenZhen Yes-Display International Technology CO.,LTD. The customers should inspect the LCM within 14 days after receiving the goods. The result of inspection should be notified to the Seller in the writing copy promptly, if the customer do not send them within 14 days, the seller has the right to judge as acceptance of goods. The inspection lot size is treated as the quantity per shipment and per model. The sampling plan shall be inspected under MIL-STD015E in Level II by single sampling. The acceptable quality level (AQL) are categorized as below grades:

CRITICAL= 0.4%, MAJOR= 0.65%, MINOR= 1.5%

8.2 Inspection condition and Warranty policy:

The delivered LCM should be stored properly, ideally under climate-controlled environment at 25 (±5) degree Celsius as well as 60% (±10) Relative Humidity. The LCM shall be inspected in the viewing angle of 45 degree from the four major angles (U/D/L/R) under the single fluorescent lamp of 20W (equal to 300 to 500 lux). For warranty, ShenZhen Yes-Display International Technology CO.,LTD. will provide 12 months of warranty period as standard, and provide the new replacement for the defective products which belong to the Seller's responsibility verified by the quality department.

8.3 Inspection Criteria:

8.3.1 Critical defect

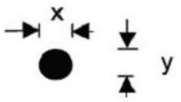
Item No.	Inspection content	Judgement
8.3.1.1	Functional defects	No display, abnormal display, short circuit, missing line, off-contrast and chromaticity, Touch Panel non-function
8.3.1.2	Model mixed	Other model mixed

8.3.2 Major defect:

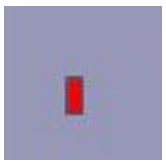
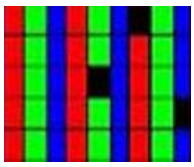
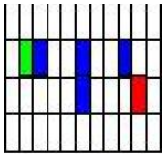
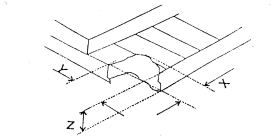
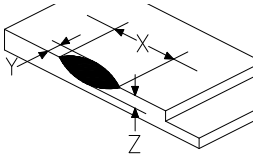
Item No.	Inspection content	Judgement
8.3.2.1	Product indication	Missing model no. and wrong model no. is indicated on the LCM.
8.3.2.2	Glass cracking	The LCD and touch panel glass crack or breakage

8.3.2.3	Missing component	The function component missing such as connector, cable, etc.

8.3.3 Minor defect (LCD) :

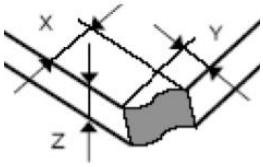
<table>
<tr><th>Item No.</th><th>Inspection content</th><th>Judgement</th></tr>
<tr><td>8.3.3.1</td><td>Black/White spot
Foreign particles
Dust in the cell</td><td>φ=(x+y)/2
 

<table>
<tr><th>Diameter (mm)</th><th>Acceptable Q'ty</th></tr>
<tr><td>Φ ≦ 0.1</td><td>Ignore</td></tr>
<tr><td>0.1 < Φ ≦ 0.25</td><td>3 (Distance>5mm)</td></tr>
<tr><td>0.25 < Φ</td><td>Not allowed</td></tr>
</table></td></tr>
<tr><td>8.3.3.2</td><td>Linear defect
Black/white line
Black/white scratch</td><td>
<table>
<tr><th>Length(mm)</th><th>Width (mm)</th><th>Acceptable Q'ty</th></tr>
<tr><td></td><td>W ≦0.03</td><td>Ignore</td></tr>
<tr><td>L≦ 5.0</td><td>0.03 <W≦0.07</td><td>3</td></tr>
<tr><td></td><td>0.07 <W</td><td>Follow 8.3.3.1</td></tr>
</table></td></tr>
<tr><td>8.3.3.3</td><td>Polarizer Bubbles
Dent on polarizer</td><td>
<table>
<tr><th>Diameter (mm)</th><th>Acceptable Q'ty</th></tr>
<tr><td>Φ ≦ 0.2</td><td>Ignore</td></tr>
<tr><td>0.2 < Φ ≦ 0.5</td><td>2 (Distance>5mm)</td></tr>
<tr><td>0.5 < Φ</td><td>Not allowed</td></tr>
</table></td></tr>
</table>

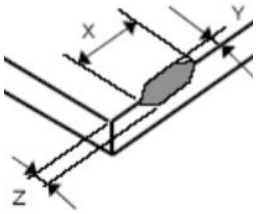
8.3.3.4	Electrical Dot defect	**Bright dot and Dark dot definition:**  or   (Two adjacent dot) **Inspection pattern: black, white, red, green, and blue screen.** Items: Bright dot — Acceptable Q'ty: N ≦ 4 (Distance >5mm) Items: Dark dot — Acceptable Q'ty: N ≦ 4 (Distance >5mm)
8.3.3.5	Glass Defect-Corner chipping	 Size(mm): X≦3mm, Y≦S , Z≦ T (S= ITO length, T=Single glass thickness) — Judgement: Accept
8.3.3.6	Glass Defect-Side fragment	 Size(mm): X≦2 mm, Y≦ border edge; Z≦T (T= single glass thickness) — Judgement: Accept

8.3.4 Minor defect (Touch Panel)

Item No.	Inspection content	Judgement

<table>
<tr><td>8.3.4.1</td><td>Scratch, dust, particles, foreign materials in “linear type”</td><td>
<table>
<tr><th>Size (mm)</th><th>Acceptable Q’ty</th></tr>
<tr><td>W≦0.05mm, L≦10mm</td><td>Ignore</td></tr>
<tr><td>0.05mm<W ≦ 0.07mm, L ≦ 10mm</td><td>3</td></tr>
<tr><td>W>0.07mm</td><td>Reject</td></tr>
</table>
</td></tr>
<tr><td>8.3.4.2</td><td>Scratch, dust, particles, foreign materials in “round type”</td><td>
<table>
<tr><th>Diameter (mm)</th><th>Acceptable Q’ty</th></tr>
<tr><td>Φ≦ 0.25mm</td><td>Ignore</td></tr>
<tr><td>0.25mm<Φ≦ 0.35mm</td><td>5</td></tr>
<tr><td>Φ > 0.35mm</td><td>Reject</td></tr>
</table>
</td></tr>
<tr><td>8.3.4.3</td><td>Air bubbles</td><td>
<table>
<tr><th>Diameter (mm)</th><th>Acceptable Q’ty</th></tr>
<tr><td>Φ≦ 0.2mm</td><td>Ignore</td></tr>
<tr><td>0.2mm<Φ≦ 0.5mm</td><td>3</td></tr>
<tr><td>Φ > 0.5mm</td><td>Reject</td></tr>
</table>
</td></tr>
<tr><td>8.3.4.5</td><td>Scratch on printing area</td><td>
<table>
<tr><th>Size (mm)</th><th>Acceptable Q’ty</th></tr>
<tr><td>W≦0.03mm, L≦5 mm</td><td>Ignore</td></tr>
<tr><td>0.03mm<W≦0.05mm, L≦5mm</td><td>3</td></tr>
<tr><td>W>0.05mm or L> 5mm</td><td>Reject</td></tr>
</table>
</td></tr>
<tr><td>8.3.4.6</td><td>Corner chipping</td><td>


<table>
<tr><th>Size(mm)</th><th>Judgement</th></tr>
<tr><td>X≦2mm, Y≦2mm
Z<1/2T
(T= single glass thickness)</td><td>Accept</td></tr>
</table>
</td></tr>
</table>

<table>
<tr>
<td>8.3.4.7</td>
<td>Edge chipping</td>
<td>


<table>
<tr><th>Size(mm)</th><th>Judgement</th></tr>
<tr><td>X≦3 mm, Y≦3 mm
Z≦1/2 T
(T= single glass thickness)</td><td>Accept</td></tr>
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9. Reliability Test Conditions and Methods

9.1 Reliability Test Conditions and Methods:

NO.	TEST ITEMS	TEST CONDITION	INSPECTION AFTER TEST
①	High Temperature Storage	80°C±2°C×96Hours	Inspection after 2~4hours storage at room temperature, the samples should be free from defects: 1, Air bubble in the LCD. 2, Seal leak. 3, Non-display. 4, Missing segments. 5, Glass crack. 6, Current IDD is twice higher than initial value. 7, The surface shall be free from damage. 8, The electric characteristic requirements shall be satisfied.
②	Low Temperature Storage	-30°C±2°C×96Hours	
③	High Temperature Operating	70°C±2°C×96Hours	
④	Low Temperature Operating	-20°C±2°C×96Hours	
⑤	Temperature Cycle(Storage)	-20°C ⟺ 25°C ⟺ 70°C (30min) (5min) (30min) 1cycle Total 10cycle	
⑥	Damp Proof Test (Storage)	50°C±5°C×90%RH×96Hours	
⑦	Vibration Test	Frequency:10Hz~55Hz~10Hz Amplitude:1.5MM X,Y,Z direction for total 3hours (packing condition test will be tested by a carton)	
⑧	Drooping Test	Drop to the ground from 1M height one time every side of carton. (packing condition test will be tested by a carton)	
⑨	ESD Test	Voltage:±8KV,R:330Ω,C:150PF,Air Mode,10times	

REMARK:

1, The Test samples should be applied to only one test item.

2, Sample side for each test item is 5~10pcs.

3,For Damp Proof Test, Pure water(Resistance＞10MΩ)should be used.

4,In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.

5, EL evaluation should be accepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.

6, Failure Judgment Criterion: Basic Specification Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

10. Cautions and Handling Precautions

10.1 Mounting method

The LCD panel of TFT module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

10.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent

[Recommended below] and wipe lightly

- Isopropyl alcohol
- Ethyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:

- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns

Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux
- Chlorine (Cl) , Sulfur (S)

If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happen by miss-handling or using some materials such as Chlorine (CI), Sulfur (S) from customer, Responsibility is on customer.

10.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended that you:

Connect any unused input terminal to power or ground, do not input any signals before power is turned on, and ground your body, work/assembly areas, and assembly equipment to protect against static electricity.

10.4 packing

- Module employs LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity

10.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- Slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

10.6 storing

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it. And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else.

[It is recommended to store them as they have been contained in the inner container at the time of delivery from us

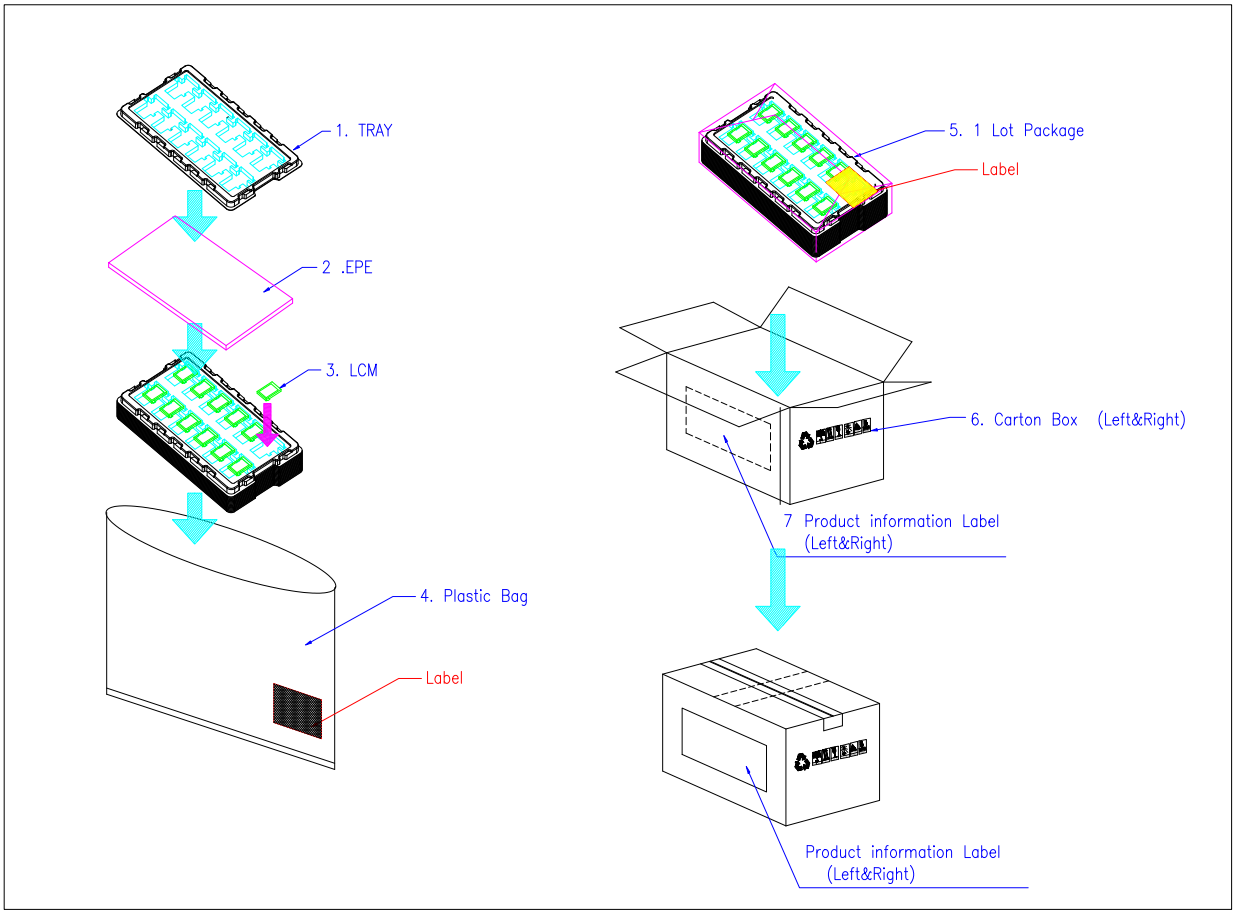
10.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.

- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water

11. Packing Method

11.1 Method



11.2 Packing Label

TBD