Project No. 项目编号	5.5HD
Customer 客户名称	
Module No. 客户型号	
Product type 产品内容	Standard LCD Module 720 x 3RGB x 1280 Dots 5.5”TFT IPS LCD
Signature by customer:	

CONTENTS

1. Document revision history:

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED HJ	APPROVED HJ
A	2020.01.22	First Release.	HJ	

2. General Description

- 5.5 inch configuration, 720 x3 RGB x 1280 dots, 16.7M colors, Transmissive ,IPS， TFT LCD module.
- Viewing Direction: ALL
- Driving IC: ILI9881C
- MIPI interface
- Logic voltage: 1.8/2.8V (typ.).
- Without touch panel

3. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Table 1

Parameter		Specifications	Unit
Outline dimensions		70.94(W) x 129.56(H) x 1,.65(D)	mm
Color TFT 320xRGBx480	TP view area	-	mm
	TP active area	-	mm
	LCD active area	68.04(W) x120.96(H)	mm
	Display format	720x3 RGB x 1280	dots
	Color configuration	RGB stripes	-
	Pixel pitch	0.0945(H) x 0.0945(V)	mm
Weight			grams

RoHS

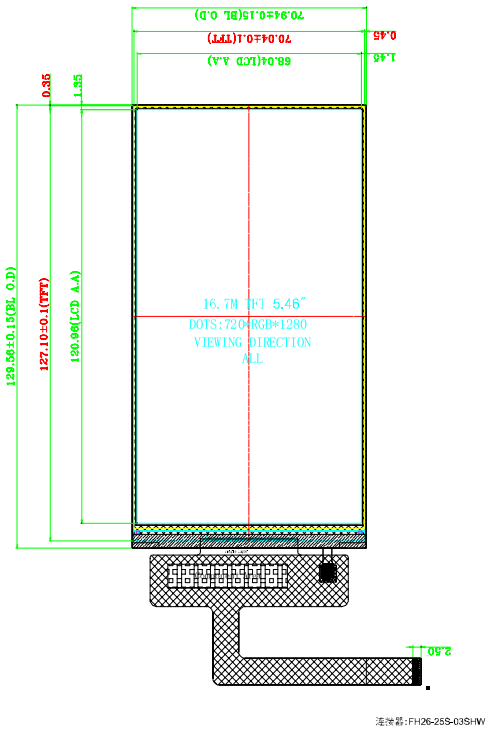
* ☐ 请重点确认

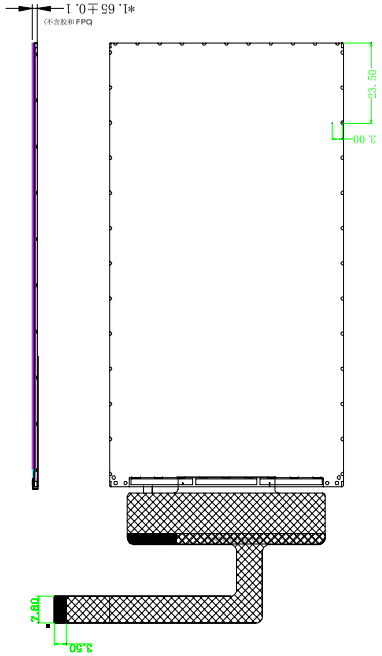
* ☐ 请重点确认

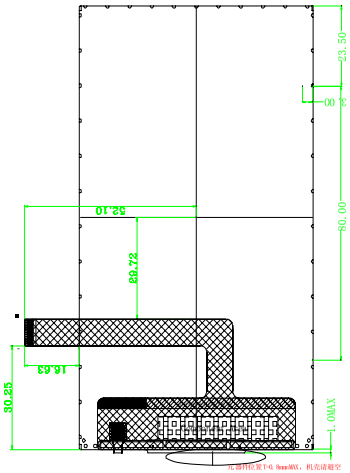
MARK	VER.	DESCRIPTION	REVISER	DATE
1	A	按客户图纸出样		2020.11.20
2	B			

CON1
MIPI

pin NO	NAME
1	LCM_ID
2	RESET
3	FMARK
4	VDD2V8
5	GND
6	GND
7	MIPI-DP3/NC
8	MIPI-DN3/NC
9	GND
10	MIPI-DP2/NC
11	MIPI-DN2/NC
12	GND
13	MIPI-DP1
14	MIPI-DN1
15	GND
16	MIPI-DP0
17	MIPI-DN0
18	GND
19	MIPI-CLKP
20	MIPI-CLKN
21	GND
22	VDD1V8
23	LED+
24	LED-
25	GND







FPC弯折处，机壳请避空

FPC弯折示意图

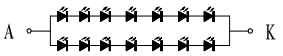
弯折出货

连接器:FH26-25S-03SHW

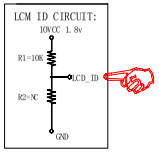
NOTES:

1.Display Type:5.5"TFT IPS 16.7M Color, Transmissive;
2.Resolution: 720RGB*1280
3.Driver IC: ILI9881C-ODT00GA;
4.Viewing Angle: ALL'CLOCK;
5.Interface Types: MIPI-24bit;
6.Connector: NA;
7.Luminance: 360min cd/m? ,400typ cd/m?;
8.Chromaticity White(X,Y): x=0.300±0.03;y=0.320±0.03;
9.Uniformity: 80% MIN;
10.Backlight: 14-chips LED,2 Strings of 7;
11.Operating Temperature: -20°C-70°C;
12.Storage Temperature: -30°C-80°C;
13.General Tolerance: ±0.2mm;
14.Check Code:
15.Warpage: ≤0.3mm;
16.All materials comply with ROHS standard.

LED CIRCUIT DIAGRAM:



If: 20*2=40mA
VF:196--22.40



	NAME	DATE	UNIT'S:	mm	COUSTOMER NO.:	*********	
DRAW:	simon	19/08/02	SCALE:	1:1	DRAWING NO.:	MS-LZ55013HI-A	REV A
CHKD:			SHEET:	1/1	PROJECT NO.:	LZ55013HI	
APPD:							
PROj:	THIRD ANGLE						

4. Interface signals

Table 2: Pin assignment

No.	Signal	Fuction
1	ID	LCD_ID=1.8V
2	RESET	Global reset pin
3	TE	Tearing effect output pin
4	VCC 2.8	Power supply(2.8v)
5	GND	Ground
6	GND	Ground
7	MIPI_TDP3	MIPI-DSI data Lane 3 positive -end input/output pin
8	MIPI_TDN3	MIPI-DSI data Lane 3 negative -end input/output pin
9	GND	Ground
10	*MIPI_TDP2*	MIPI-DSI data Lane2 positive -end input/output pin
11	*MIPI_TDN2*	MIPI-DSI data Lane 2 negative -end input/output pin
12	GND	Ground
13	*MIPI_TDP1*	MIPI-DSI data Lane 1 positive -end input/output pin
14	*MIPI_TDN1*	MIPI-DSI data Lane 1 negative -end input/output pin
15	GND	Ground
16	*MIPI_TDP0*	MIPI-DSI data Lane 0 positive -end input/output pin
17	*MIPI_TDN0*	MIPI-DSI data Lane 0 negative -end input/output pin
18	GND	Ground
19	MIPI_TCP	MIP`I-DSI clock Lane positive-end input pin
20	MIPI_TCN	MIPI-DSI clock Lane negative-end input pin
21	GND	Ground
22	IOVCC1.8	Power supply(1.8v)
23	LEDA	LED Anode(+)
24	LEDK	LED Cathode(-)
25	GND	Ground

5. Absolute Maximum Ratings

5.1 Electrical Maximum Ratings – for IC Only

Table 3: Electrical Maximum Ratings – for IC

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (VCC)	VCC	-0.3	+3.6	V	1
Power supply voltage (IOVCC)	IOVCC	-0.3	+3.6	V	1

Note:

1. VCC, GND must be maintained.
2. The modules may be destroyed if they are used beyond the absolute maximum ratings.

5.2 Environmental Condition

Table 4

Item	Operating temperature (Topr)		Storage temperature (TSgt) (Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-20°C	+70°C	-30°C	+80°C	Dry
Humidity (Note 1)	80% max. RH for Ta ≤ 40°C < 50% RH for 40°C < Ta ≤ Maximum operating temperature				No condensation

Note 1: Product cannot sustain at extreme storage conditions for long time.

6. Electrical Specifications

Typical Electrical Characteristics

At Ta = 25 °C, VCC=IOVCC= 2.6V to 3.3V, GND=0V.

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (logic)	VCC-GND		2.6	2.8	3.3	V
Supply voltage (logic)	IOVCC-GND		1.65	1.8/2.8	3.3	V
Supply current (Logic & LCD)	ICC	VDD=2.8V	-	-	20	mA
Supply voltage of white LED backlight	VLED =$V_{(BL+)}$-$V_{(BL-)}$	Forward current =40mA Number of LED dies = 12	-	19.2	-	V
Luminance (on the module surface)			-	300	-	cd/m^2

7. Optical Characteristics

Table 7: Optical specifications

Items		Symbol	Condition	Specifications			Unit	Note
				Min.	Typ.	Max.		
Contrast Ratio		CR		-	800	-	-	
Response Time		T_{R+} T_F		-	35	40	ms ms	
Chromaticity	Red	X_R		0.636	0.656	0.676	-	
		Y_R		0.300	0.320	0.340	-	
	Green	X_G		0.268	0.288	0.308	-	
		Y_G		0.569	0.589	0.609	-	
	Blue	X_B		0.118	0.138	0.158	-	
		Y_B		0.059	0.079	0.099	-	
	White	X_W		0.287	0.307	0.327	-	
		Y_W		0.306	0.326	0.346	-	
Viewing angle	Hor.	ϕ1(3 o'clock)	Center CR≥10	-	80	-	deg.	
		ϕ2(9 o'clock)		-	80	-		
	Ver.	θ2(12 o'clock)		-	80	-		
		θ1(6 o'clock)		-	80	-		
NTSC ratio					65		%	

Note 1:

1. Contrast Ratio(CR) is defined mathematically as :

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

2. Surface luminance is the center point across the TFT-LCD surface 240 mm from the surface with all pixels displaying white.
3. Response time is the time required for the display to transition from black to white(Rise Time, Tr) and from white to black(Falling Time, Tf).
4. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the TFT-LCD surface.
5. Optimum contrast is obtained by adjusting the TFT-LCD Threshold voltage(Vth & Vsat)

Note 2: Definition of Response Time: The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".

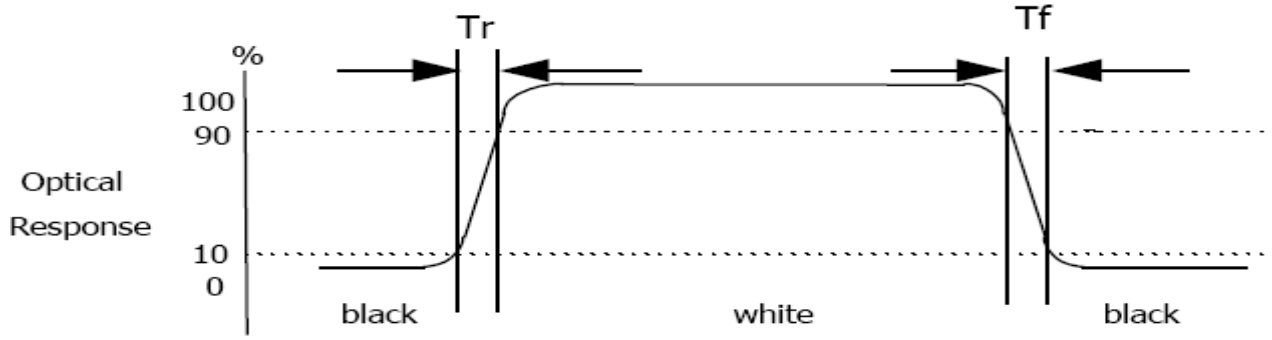


Figure 2. The definition of Response Time

Note 3: Viewing Angle

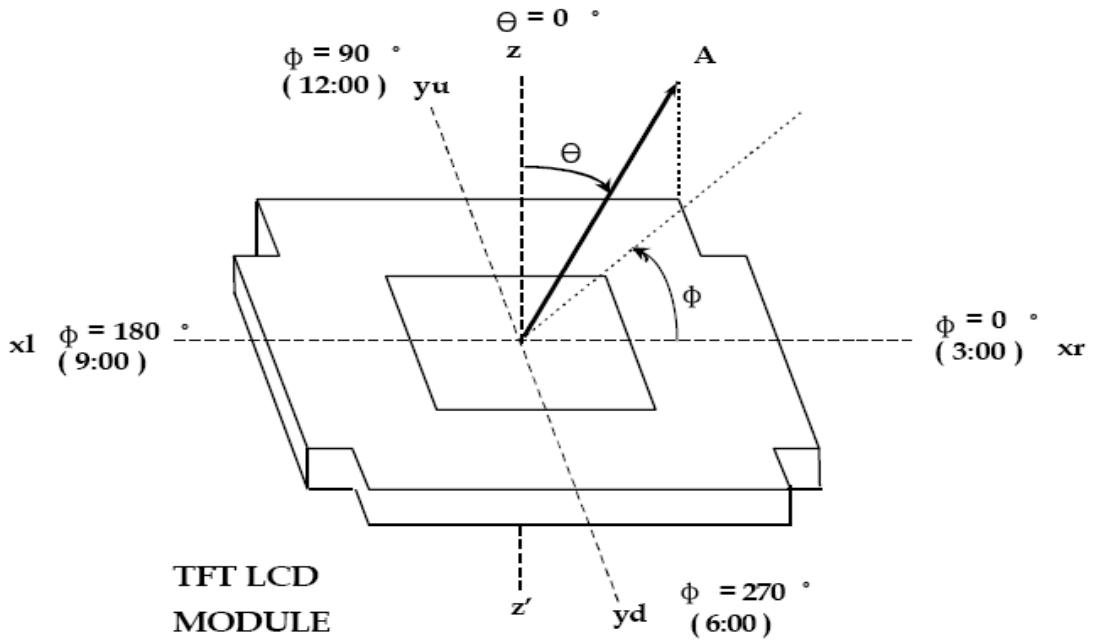


Figure 3 The definition of viewing angle

Note 4: Measurement Set-Up:

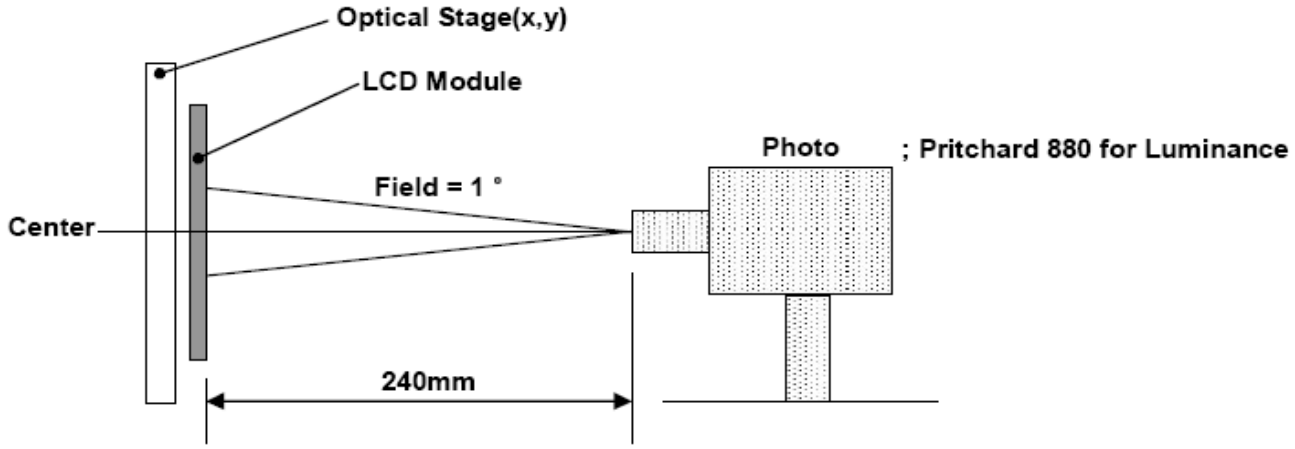


Figure 5

Measuring Condition ;

-Measuring surroundings : Dark Room

-Measuring temperature : Ta=25℃

-Adjust operating voltage to get optimum contrast at the center of the display.

-Measured value at the center point of LCD panel after more than 30 minutes while backlight turning on.

8. Timing Characteristics

8.1 High Speed Mode

Table 8: Normal Write Mode (VCC =2.4~3.3V, IOVCC=1.65~3.3V)

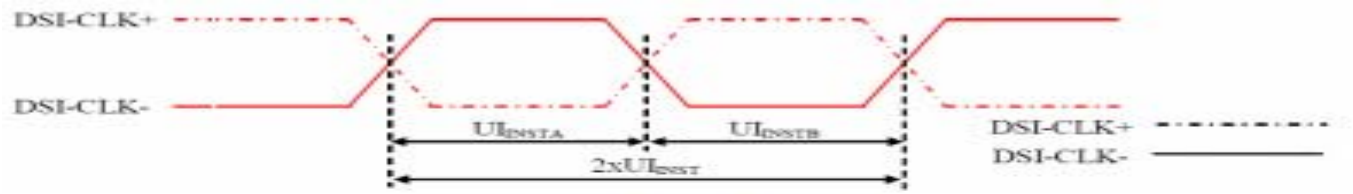


Figure 114 DSI Clock Channel Timing

Table 45 DSI Clock Channel Timing

Signal	Symbol	Parameter	Min	Max	Unit
DSI-CLK+/-	2xUI$_{INST}$	Double UI instantaneous	4	25	ns
DSI-CLK+/-	UI$_{INSTA}$,UI$_{INSTB}$	UI instantaneous Half	2	12.5	ns

Note: UI = UI$_{INSTA}$= UI$_{INSTB}$

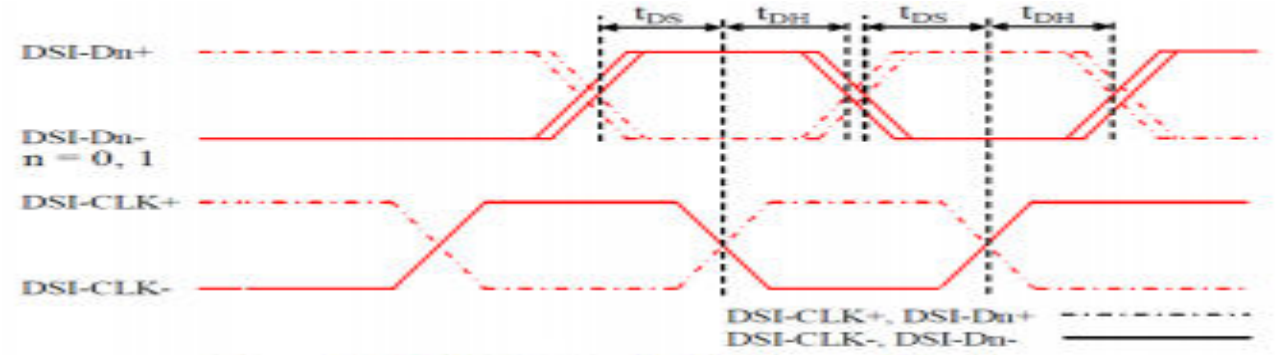


Figure 115 DSI Data to Clock Channel Timings

Table 46 DSI Data to Clock Channel Timings

Signal	Symbol	Parameter	Min	Max
DSI-Dn+/- , n=0 and 1	t_{DS}	Data to Clock Setup time	0.15xUI	-
	t_{DH}	Clock to Data Hold Time	0.15xUI	-

Figure 7. **High Speed Mode** Timing

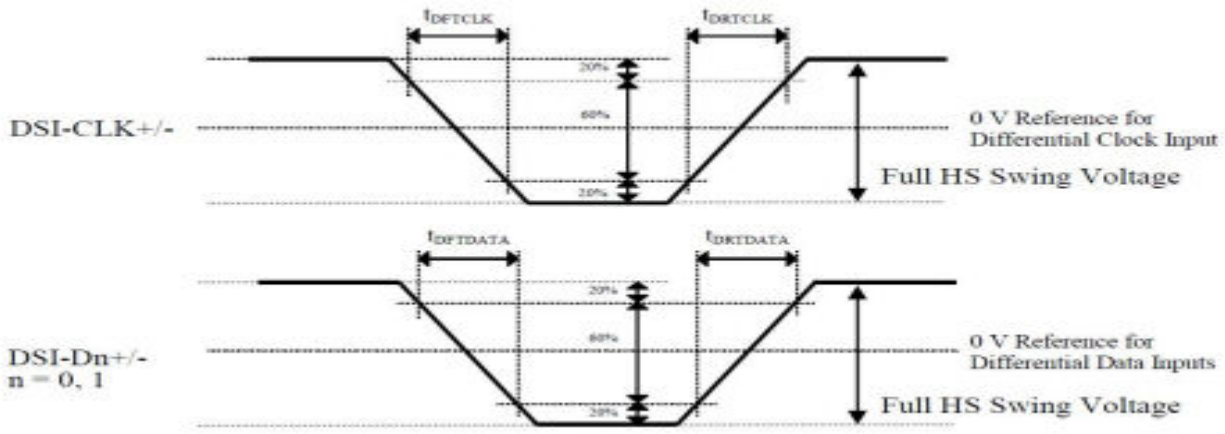


Figure 116 Rise and Fall Timings on Clock and Data Channels

Table 47 Rise and Fall Timings on Clock and Data Channels

Parameter	Symbol	Condition	Specification			
			Min	Typ	Max	Unit
Differential Rise Time for Clock	t_{DRTCLK}	DSI-CLK+/-	-	-	150 (Note)	ps
Differential Rise Time for Data	$t_{DRTDATA}$	DSI-Dn+/- n=0 and 1	-	-	150 (Note)	ps
Differential Fall Time for Clock	t_{DFTCLK}	DSI-CLK+/-	-	-	150 (Note)	ps
Differential Fall Time for Data	$t_{DFTDATA}$	DSI-Dn+/- n=0 and 1	-	-	150 (Note)	ps

Note:The display module has to meet timing requirements, what are defined for the transmitter (MPU) on MIPI D-Phy standard

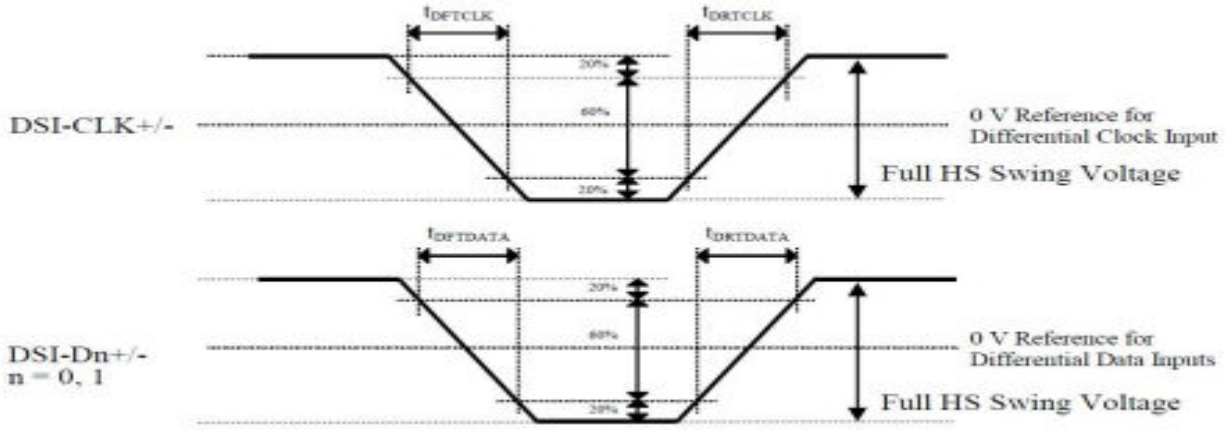


Figure 116 Rise and Fall Timings on Clock and Data Channels

Table 47 Rise and Fall Timings on Clock and Data Channels

Parameter	Symbol	Condition	Specification			
			Min	Typ	Max	Unit
Differential Rise Time for Clock	t_{DRTCLK}	DSI-CLK+/-	-	-	150 (Note)	ps
Differential Rise Time for Data	$t_{DRTDATA}$	DSI-Dn+/- n=0 and 1	-	-	150 (Note)	ps
Differential Fall Time for Clock	t_{DFTCLK}	DSI-CLK+/-	-	-	150 (Note)	ps
Differential Fall Time for Data	$t_{DFTDATA}$	DSI-Dn+/- n=0 and 1	-	-	150 (Note)	ps

Note:The display module has to meet timing requirements, what are defined for the transmitter (MPU) on MIPI D-Phy standard

Low Power Mode

Lower Power Mode and its State Periods are illustrated for reference purposes on the Bus Turnaround (BTA) from the MPU to the Display Module (ILI9806E) sequence below.

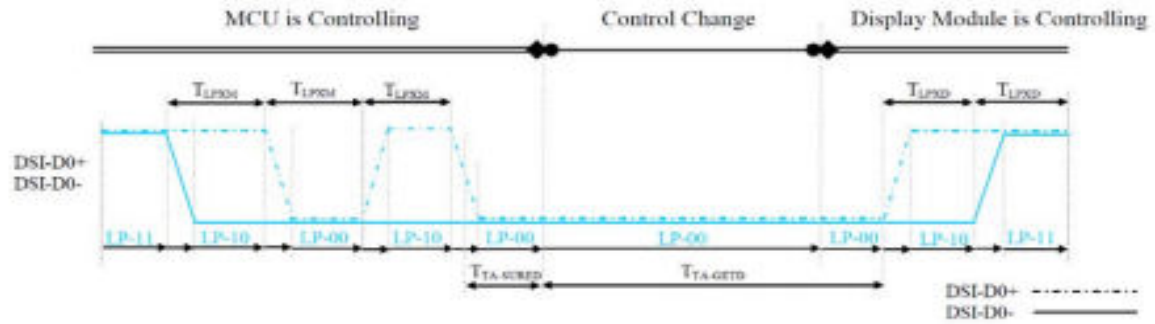


Figure 117 BTA from the MPU to the Display Module

Lower Power Mode and its State Periods are illustrated for reference purposes on the Bus Turnaround (BTA) from the Display Module (ILI9806E) to the MPU sequence below.

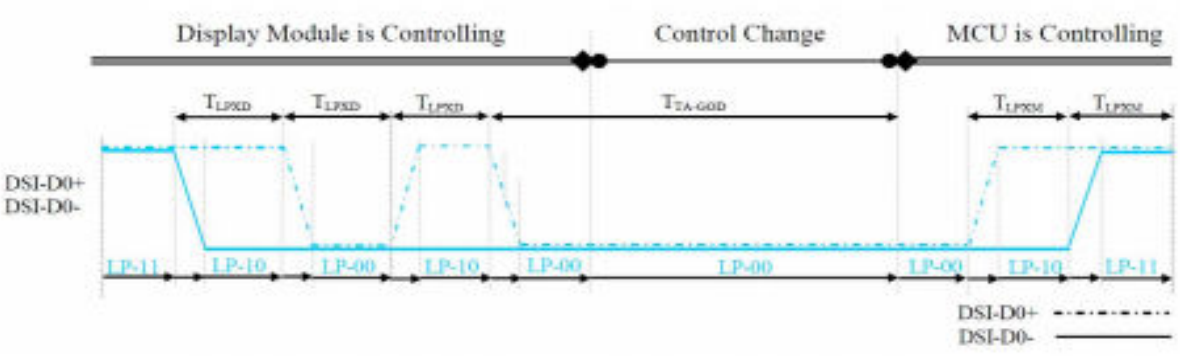


Figure 118 BTA from the Display Module to the MPU

Table 48 Low Power State Period Timings – A

Signal	Symbol	Description	Min	Max	Unit
DSI-D0+/-	T_{LPXM}	Length of LP-00, LP-01, LP-10 or LP-11 periods MPU → Display Module (ILI9806E)	50	75	ns
DSI-D0+/-	T_{LPXD}	Length of LP-00, LP-01, LP-10 or LP-11 periods Display Module (ILI9806E) → MPU	50	75	ns
DSI-D0+/-	$T_{TA-SURED}$	Time-out before the Display Module (ILI9806E) starts driving	T_{LPXD}	$2 \times T_{LPXD}$	ns

Table 49 Low Power State Period Timings – B

Signal	Symbol	Description	Time	Unit
DSI-D0+/-	$T_{TA-GETD}$	Time to drive LP-00 by Display Module (ILI9806E)	$5 \times T_{LPXD}$	ns
DSI-D0+/-	T_{TA-GOD}	Time to drive LP-00 after turnaround request – MPU	$4 \times T_{LPXD}$	ns

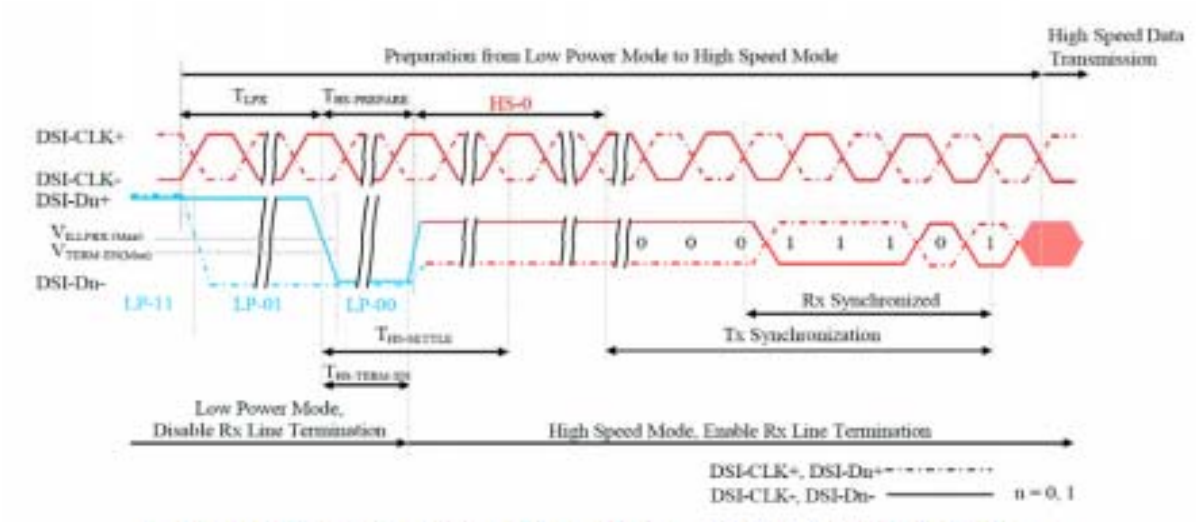


Figure 119 Data Lanes – Low Power Mode to High Speed Mode Timings

Table 50 Data Lanes – Low Power Mode to High Speed Mode Timings

Signal	Symbol	Description	Min	Max	Unit
DSI-Dn+/-, n=0 and 1	T_{LPX}	Length of any Low Power State Period	50	-	ns
DSI-Dn+/-, n=0 and 1	$T_{HS-PREPARE}$	Time to drive LP-00 to prepare for HS Transmission	40+4xUI	85+6xUI	ns
DSI-Dn+/-, n=0 and 1	$T_{HS-TERM-EN}$	Time to enable Data Lane Receiver line termination measured from when Dn crosses VILMAX	-	35+4xUI	ns

8.2 Reset Operation of IC

Table 9: Reset Timing Characteristics (VCC = 2.4~3.3V, IOVCC=1.65~3.3V)

Item	Symbol	Unit	Min.	Typ.	Max.
Reset low-level width	tRES	ms	1	-	-
Reset rise time	trRES	μs	-	-	10

Figure 8: Reset Timing

9. Reliability Test Item

Test Item	Sample Type	Test Condition	Test result determinant gist
High temperature storage	Normal temperature	70±3℃;96H	the inspection of appearance and function character.
	Wide temperature	80±3℃;96H	
Low temperature storage	Normal temperature	-20±3℃;120H	
	Wide temperature	-30±3℃;120H	
High temperature /humidity storage	Normal temperature	50℃±3℃,90%±3%RH;96H	
	Wide temperature	60℃±3℃,90%±3%RH;96H	
High temperature operation	Normal temperature	60±3℃;96H	No objection of the function character; no fatal objection of the appearance.
	Wide temperature	70±3℃;96H	
Low temperature operation	Normal temperature	0±3℃;96H	
	Wide temperature	-20±3℃;96H	
High temperature /humidity operation	Normal temperature	40℃±3℃,90%±3%RH;96H	
	Wide temperature	50℃±3℃,90%±3%RH;96H	
Temperature Shock	Normal temperature	-20±3℃,30min→70±3℃,30 min;10cycle	inspect the objections appearance、function & the whole structure
	Wide temperature	-30±3℃,30min 80±3,30min;10cycle	The inspection of appearance、function & the whole structure

2. If the LCD screen is damaged and the liquid crystal leaks out, do not lick and swallow. When the liquid is attach to your hand, skin, cloth etc, wash it off by using soap and water thoroughly and immediately.
3. Don't apply excessive force on the surface of the LCM.
4. If the surface is contaminated ,clean it with soft cloth. If the LCM is severely contaminated , use Isopropyl alcohol/Ethyl alcohol to clean. Other solvents may damage the polarizer . The following solvents is especially prohibited: water , ketone Aromatic solvents etc.
5. Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
6. Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
7. Don’t disassemble the LCM.
8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
    - Be sure to ground the body when handling the LCD modules.
    - Tools required for assembling, such as soldering irons, must be properly grounded.
    - To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.
    - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
9. Do not alter, modify or change the the shape of the tab on the metal frame.
10. Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
11. Do not damage or modify the pattern writing on the printed circuit board.
12. Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector
13. Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
14. Do not drop, bend or twist LCM.

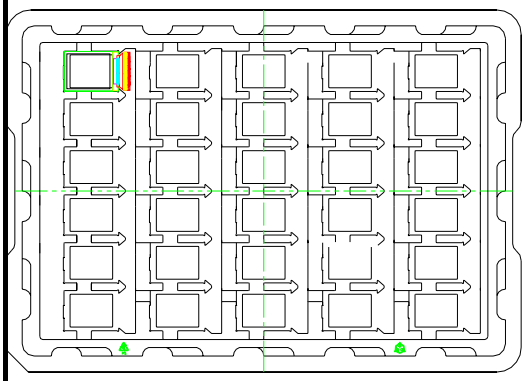
10.2 Storage

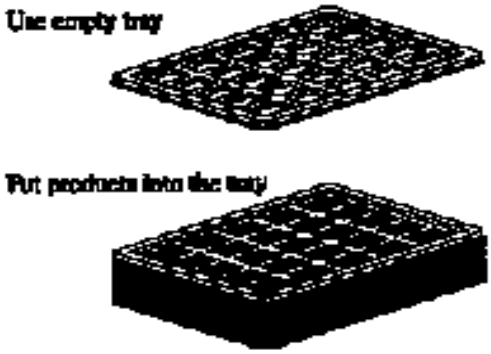
1. Store in an ambient temperature of 5 to 45 °C, and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
2. Storage in a clean environment, free from dust, active gas, and solvent.
3. Store in antistatic container

11. Packing (Reference only)

Packing Method

(1) (2)





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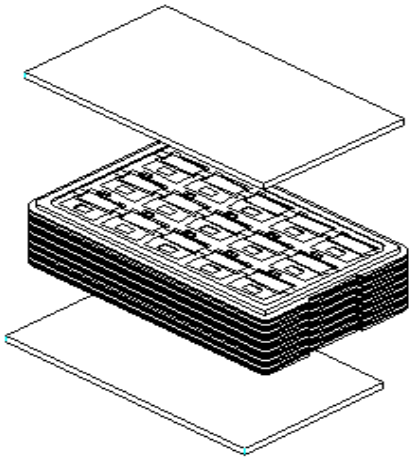

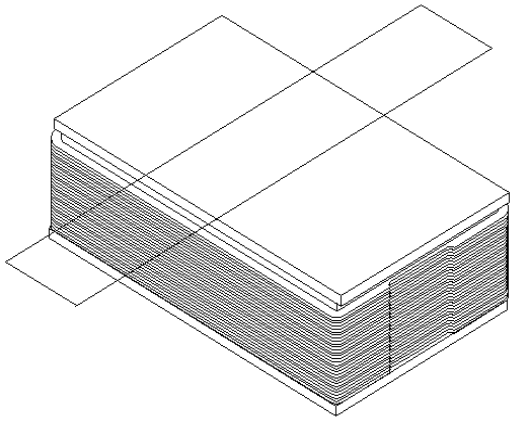

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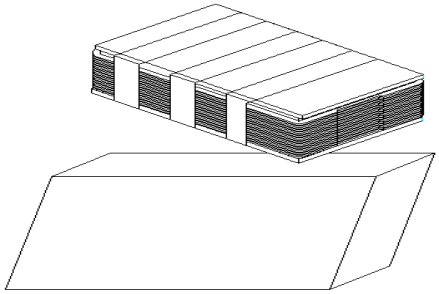

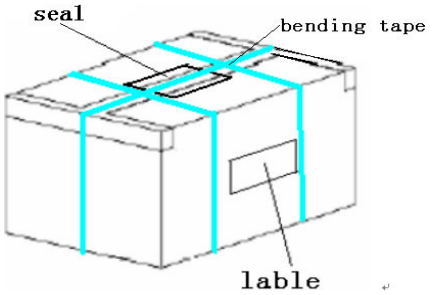

1. Put module into tray cavity:
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above:
4. Fix the cardboard to the tray stack with adhesive tape:
5. Put the tray stack into carton.
6. Carton sealing with adhesive tape.

- END -