



**SPECIFICATION
FOR
LCD Module
PV05505TD39C-C**

MODULE:	PV05505TD39C-C
CUSTOMER:	



CUSTOMER	INITIAL	DATE
APPROVED BY		

REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2018-10-11	-	First Issued.	YANG
V1.1	2019-08-16	5	Updata drawing(更改 TP IC)	XIAO



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1. General Description

* DESCRIPTION

PV05505TD39C-C is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 5.46" TFT-LCD contains 720 x 1280 pixels, and can display up to 16.7M colors.

* Features

- Low Input Voltage: IOVCC: 1.65~3.3V;VCC: 2.5~3.3V
- Display Colors of TFT LCD: 16.7M colors
- Interface: MIPI-4Lanes
- Internal Power Supply Circuit.

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	68.04(H) *120.96(V) (5.46 inch)	mm	-
Driver element	a-Si TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	720(RGB) *1280	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.0315(H) *0.0945(V)	mm	-
Viewing angle	All	o'clock	-
Drive IC	ST7703	-	-
Display mode	Normally black	-	-
Operating temperature	-20~+70	°C	-
Storage temperature	-30~+80	°C	-

Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	79	-	mm	±0.05
	Vertical(V)	-	144.4	-	mm	±0.05
	Depth(D)	-	2.84	-	mm	±0.3
Weight		-	TBD	-	g	-



规格受控编号: 版本号: A/1 发布日期: 三年

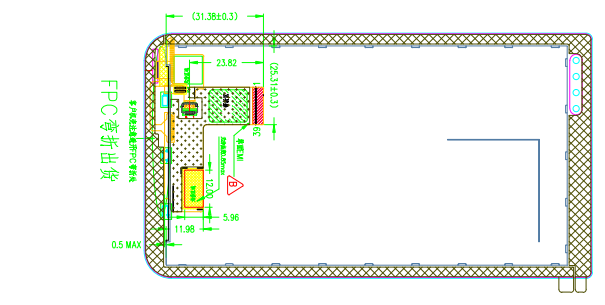
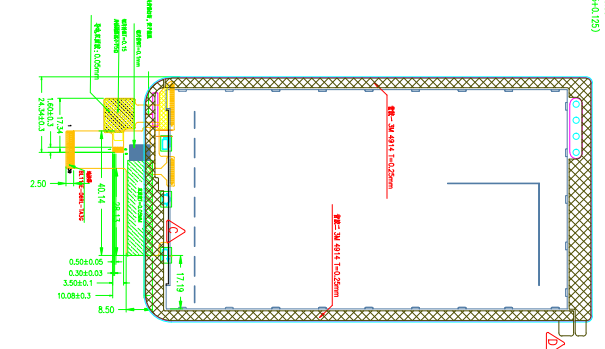
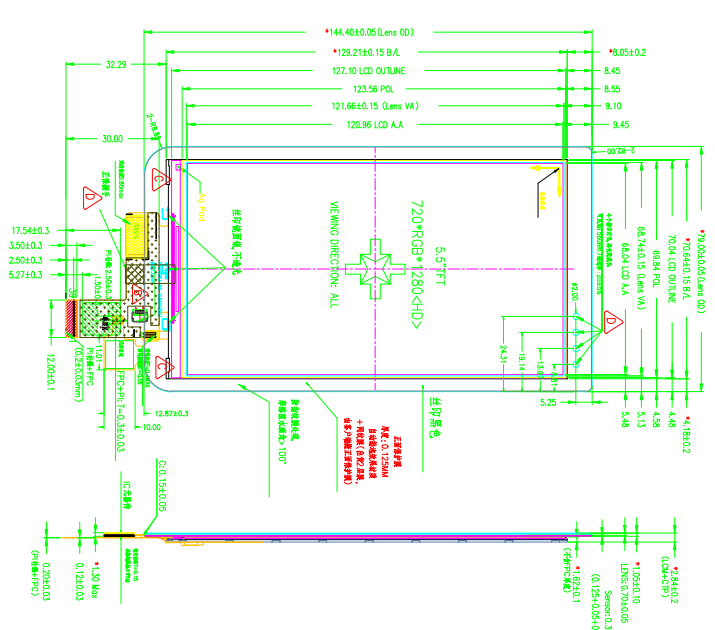
- LCM 产品特征 (LCM Features) :

显示模组 (Display mode):	TF1/Normal BLACK
驱动芯片 (Driver IC):	ST7703
液晶模组 (Viewing direction):	All
接口类型 (Interface Types):	MPI VIDEO MODE
背光类型 (Backlight Types):	14pcs, 7#2#共0mA (20mA/LED), 背光寿命 19.6~23.8V
LCM 芯片 (LCM chip Partness):	300 ad/m2 Min, 300 ad/m2 Typ
液晶模组颜色 (LCM color Consist):	(X=0.29±0.03, Y=0.30±0.03)
液晶模组均匀性 (LCM Uniformity):	80% MIN
液晶模组温度 (Operation Temperature):	-20° C ~ 70° C
液晶模组存储温度 (Storage Temperature):	-30° C ~ 80° C
液晶模组厚度 (Glass Working Thickness):	<=0.3MM
连接器 (FPC connector):	BL115E-06RL-1A3G

二、CTP 技术要求 (CTP Technical requirements)

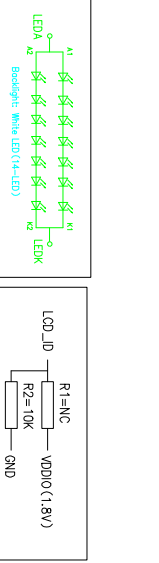
1. 材料: F+T: Cover Glass+OCA+ITO Film+OCA+ITO Film+FPC, 总厚度: 1.05±0.1mm;
2. IC 型号: GT1151Q, 通道数: 20*11, 支持5点触控, 工作电压: 3.3V, 中板方板: 下板触点, IIC接口, IIC地址: 0x28, IIC地址: 0x28;
3. 透光率: >85% (T分率: X, Y, (可接受片要求);
4. 工作温度范围: -20°~+70°, <90%RH; 推荐温度范围: -30°~+80°, <90%RH;
5. 表面硬度: >6H (铅笔硬度测试);
6. Cover Glass 材质: 钢化玻璃, 符合ROHS标准;
7. 其他标注公差: ±0.2;

Sensor ID
OPT1=GNID
OPT2=GNID



接口定义

NO.	PIN NAME
1	GND
2	NC
3	TP_VCC 2.8V
4	TP_GND
5	TP_SDA 1.8V
6	TP_SCL 1.8V
7	TP_RST 1.8V
8	TP_INT 1.8V
9	TP_AST 1.8V
10	NC
11	NC
12	NC
13	NC
14	GND
15	VDD 2.8V
16	I/OV0 1.8V
17	GND
18	LOD#
19	RST
20	TE
21	GND
22	LCM_DATA1
23	LCM_DATA1
24	GND
25	CLKP
26	GND
27	GND
28	LCM_DATA0
29	LCM_DATA0
30	GND
31	LCM_DATA2
32	LCM_DATA2
33	GND
34	LCM_DATA3
35	LCM_DATA3
36	LEDA
37	LEDB
38	LEDA
39	GND

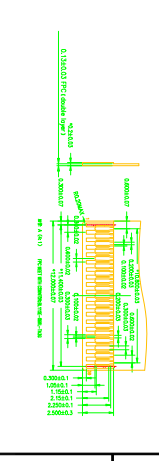


历史版本

版本 (Version)	修改 (SWRk)	原因 (The first edition)
V4	△	增加LED背光驱动电路
V3	△	增加LED背光驱动电路
V2	△	增加LED背光驱动电路
V1	△	增加LED背光驱动电路
V0	△	增加LED背光驱动电路

IP 接口定义

NO.	PIN NAME
1	GND
2	RST 1.8V
3	INT 1.8V
4	SCL 1.8V
5	SDA 1.8V
6	VCC 2.8V



NO.	变更内容 (Change Content)	变更日期 (Change Date)	变更人 (Change Person)	审核人 (Check Person)	批准人 (Approve Person)
V4	增加LED背光驱动电路	2019.08.06			
V3	增加LED背光驱动电路	2018.10.30			
V2	增加LED背光驱动电路	2018.10.17			
V1	增加LED背光驱动电路	2018.10.04			
V0	增加LED背光驱动电路	2018.09.10			

1	2	3	4	5	6	7
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3.Pin Description

Pin NO.	Symbol	Level	Remark
1	GND	L	Ground
2	NC	/	Not connect
3	TP VCC2.8	H	A supply voltage
4	GND	L	Ground
5	TP-SCL	H	Serial clock input
6	TP-SDA	H	Serial data input pin
7	GND	L	Ground
8	TP-INT	H	Interrupt pin
9	TP-RST	H	Reset pin
10-13	NC	/	Not connect
14	GND	L	Ground
15	VDD 2.85V	H	A supply voltage
16	IOVDD 1.8V	H	A supply voltage
17	GND	L	Ground
18	LCD-ID	/	Read ID
19	RST	H/L	Reset pin
20	TE	H/L	Tearing effect output
21	GND	L	Ground
22	LCM_DATAP1	H/L	MIPI_DP1+are differential data signal line
23	LCM_DATAN1	H/L	MIPI_DP1- are differential data signal line
24	GND	L	Ground
25	CLKN	H/L	CLOCK Lane negative-end input pin
26	CLKP	H/L	CLOCK Lane positive-end input pin
27	GND	L	Ground
28	LCM_DATAP0	H/L	MIPI_DP0+ are differential data signal line
29	LCM_DATAN0	H/L	MIPI_DP0- are differential data signal line
30	GND	L	Ground
31	LCM_DATAP2	H/L	MIPI_DP2+ are differential data signal line
32	LCM_DATAN2	H/L	MIPI_DP2- are differential data signal line
33	GND	L	Ground
34	LCM_DATAP3	H/L	MIPI_DP3+ are differential data signal line
35	LCM_DATAN3	H/L	MIPI_DP3- are differential data signal line



36	GND	L	Ground
37	LEDK	L	Backlight Cathode
38	LED_A	H	Backlight Anode
39	GND	L	Ground



4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min	Max.		
Supply Voltage for Logic circuit	IOVCC	1.65	3.3	V	
Supply Voltage for analog circuit	Vcc	2.5	3.3	V	

4.2 DC ELECTRICAL CHARACTERISTICS

4.2.1 OPERATING CONDITIONS

Typical Operating Conditions (Ta=25°C)

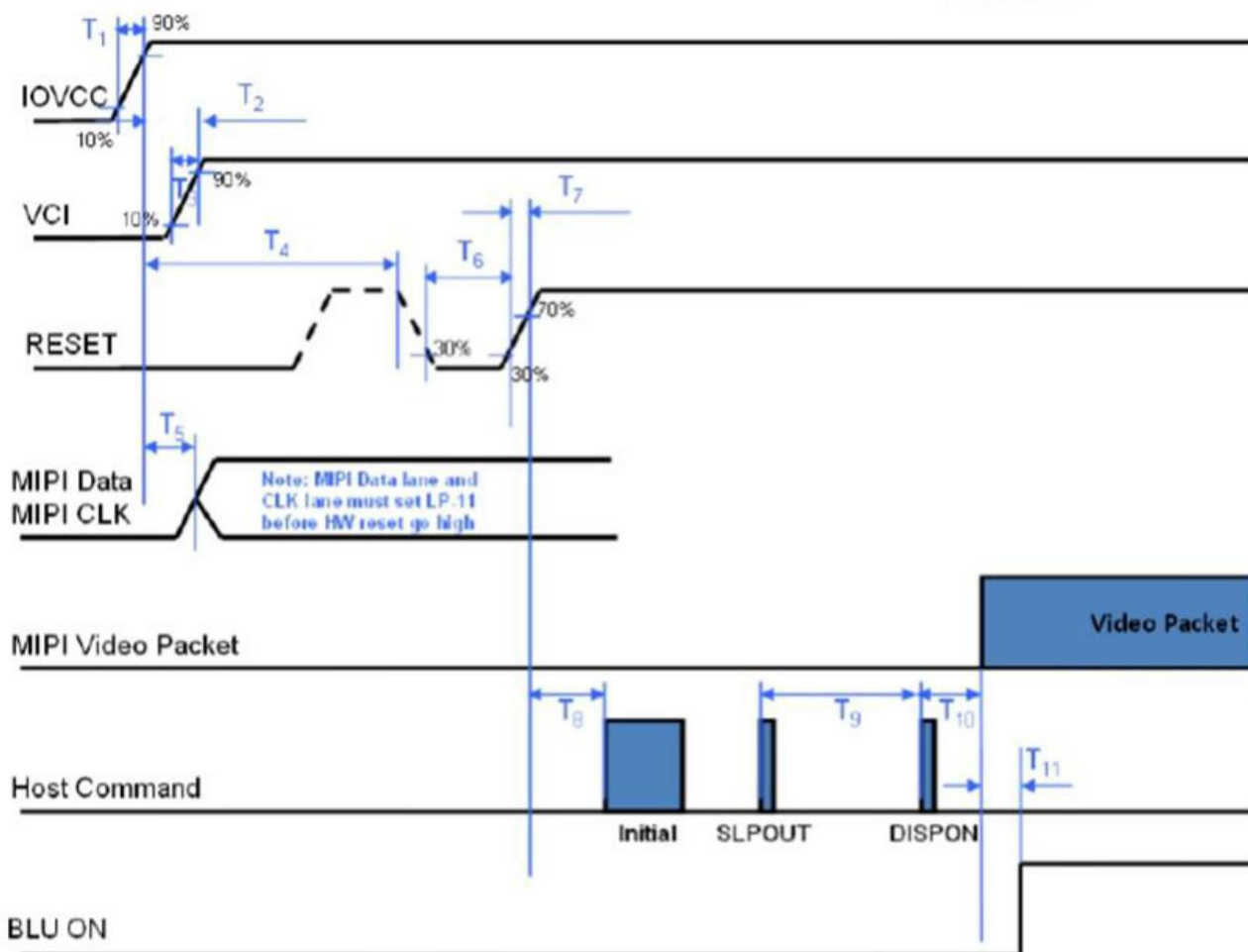
Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Power Supply	Vcc	2.5	2.8	3.3	V	
Power Supply	IOVCC	1.65	1.8	2.0	V	
Normal mode Current consumption	Icc	-	50	-	mA	VCC=2.8V
TFT Gate ON Voltage	VGH	15	-	18	V	
TFT Gate OFF Voltage	VGL	-12	-	-10	V	

4.2.2 BACKLIGHT UNIT (GND=0V)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Forward supply Voltage	Vf	19.6	-	23.8	V	
Forward supply Current	If	-	40	-	mA	
LCM Luminance	Lv	360	390	-	cd/m2	I _B =40mA
Uniformity	/	80			%	-



4.3 MIPI Interface Characteristics



	Min.	Typ.	Max.	Unit
T1	0.01	-	10	ms
T2	No Limit			ms
T3	0.01	-	10	ms
T4	1	-	-	ms
T5	1	-	-	ms
T6	10	-	-	us
T7	No Limit			ns
T8	15	-	-	ms
T9	120	-	-	ms
T10	No Limit			ms
T11	100	150	-	ms



High Speed Mode

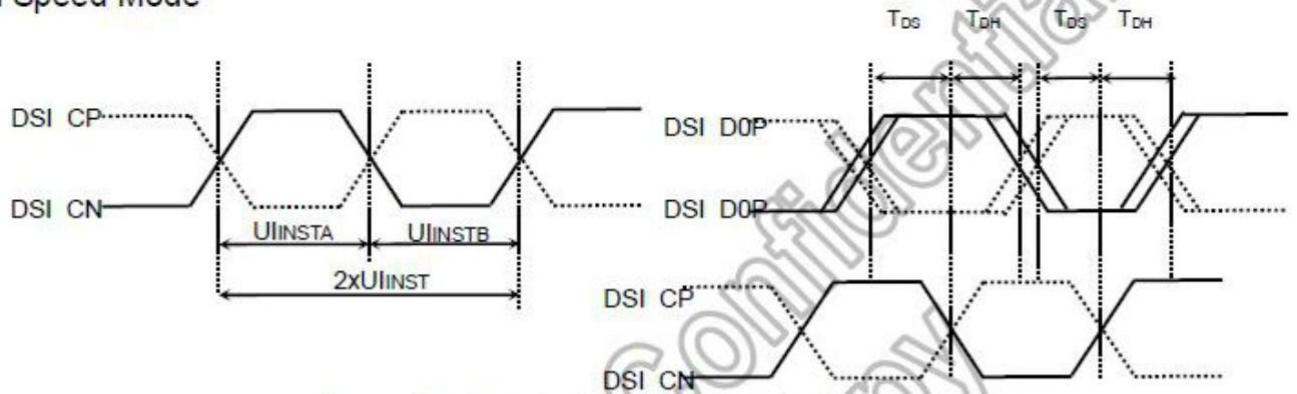


Figure 7.4: DSI clock timing Characteristics

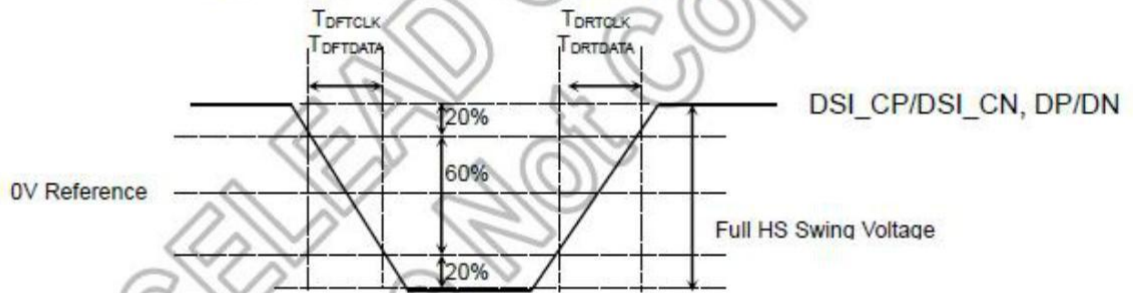


Figure 7.5: Rising and falling time on clock and data channel

(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.5V to 3.3V, TA = -30 to 70°C)

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Double UI instantaneous	2xUIINST	TBD	-	25	ns
	UI instantaneous	UIINSTA UIINSTB	TBD	-	12.5	ns
DP/DN	Data to clock setup time	T _{DS}	0.15xUI	-	-	ps
	Data to clock hold time	T _{DH}	0.15xUI	-	-	ps
DSI_CP/ DSI_CN	Differential rise time for clock	T _{DRTCLK}	150	-	0.3UI	ps
	Differential fall time for clock	T _{DFTCLK}	150	-	0.3UI	ps
DP/DN	Differential rise time for data	T _{DRTDATA}	150	-	0.3UI	ps
	Differential fall time for data	T _{DFTDATA}	150	-	0.3UI	ps

Table 7.3: DSI High Speed Mode Characteristics



Low Power Mode

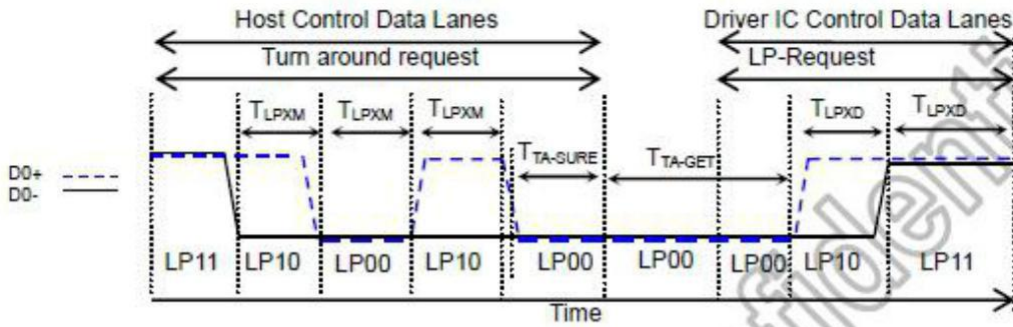


Figure 7.6: BTA from HOST to Display Module Timing

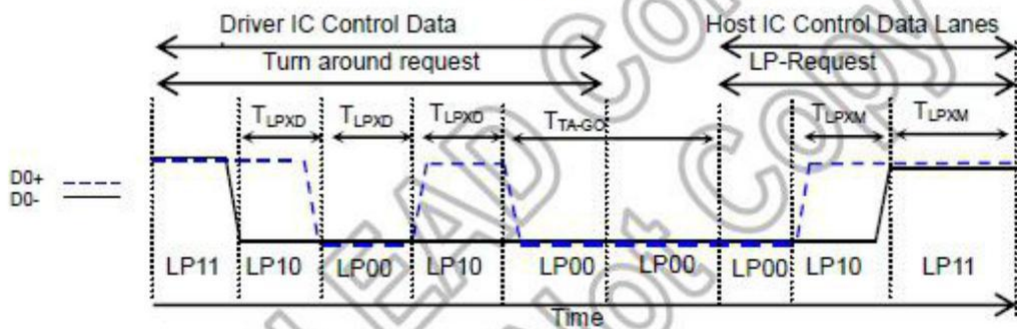
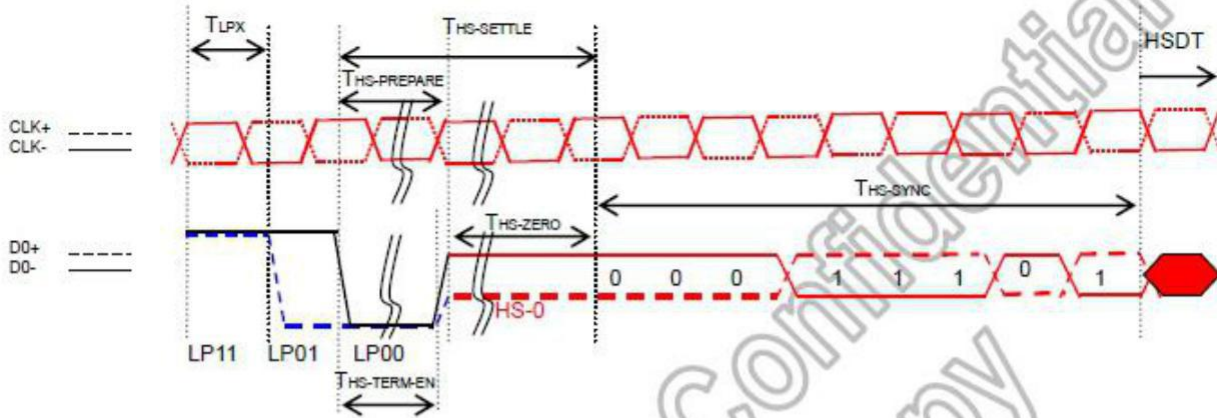


Figure 7.7: BTA from Display Module Timing to HOST

(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.3V to 3.3V, TA = -30 to 70°C)

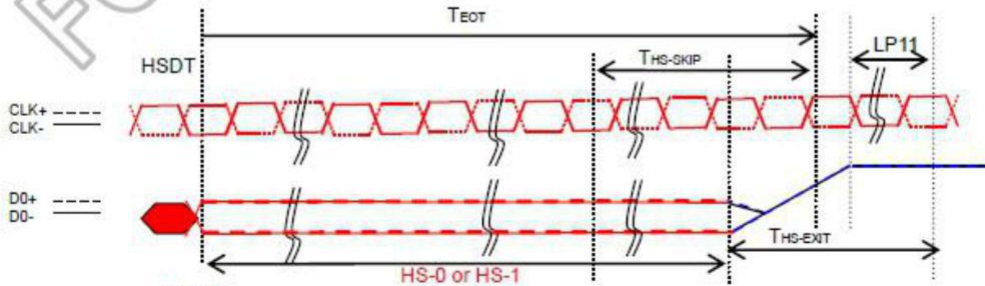
Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Length of LP-00/LP01/LP10/LP11 Host → Display module	T _{LPXM}	50	-	-	ns
	Length of LP-00/LP01/LP10/LP11 Display module → Host	T _{LPXD}	50	-	-	ns
	Time-out before the MPU start driver	T _{TA-SURE}	T _{LPXD}	-	2xT _{LPXD}	ns
	Time to drive LP-00 by display module	T _{TA-GET}	5xT _{LPXD}	-	-	ns
	Time to drive LP-00 after turnaround request Host	T _{TAGO}	4xT _{LPXD}	-	-	ns

Table 7.4: DSI Low Power Mode Characteristics



Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Length of LP-00/LP01/LP10/LP11	TLPX	50	-	-	ns
	Time to Driver LP-00 to prepare for HS transmission	THS-PREPARE	40+4UI	-	85+6UI	ns
	Time to enable data receiver line termination	THS-TERM-EN	-	-	35+4xUI	ns
	Time to drive LP-00 by display module	T _{TA-GET}	5xTLPXD	-	-	ns
	Time to drive LP-00 after turnaround request Host	T _{TAGO}	4xTLPXD	-	-	ns

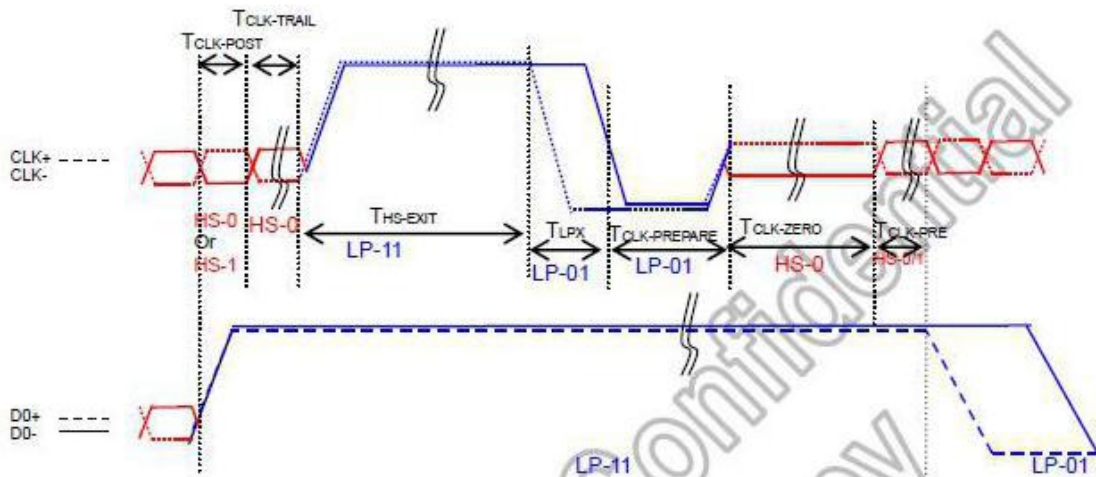
Table 7.5: DSI Low Power Mode to High Speed Mode Timing



NOTE:
If the last bit is HS-0, the transmitter changes from HS-0 to HS-1
If the last bit is HS-1, the transmitter changes from HS-1 to HS-0

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Time-Out at Display Module to Ignore Transition Period of EoT	THS-SKIP	40	-	55+4xUI	ns
	Time to Driver LP-11 after HS Burst	THS-EXIT	100	-	-	ns

Table 7.6: DSI Low Power Mode to High Speed Mode Timing



Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Time that the MCU shall continue sending HS clock after the last associated Data Lane has transitioned to LP mode	T _{CLK-POST}	60+52xUI	-	-	ns
	Time to drive HS differential state after last payload clock bit of a HS transmission burst	T _{CLK-TRAIL}	60	-	-	ns
	Time to drive LP-11 after HS burst	T _{HS-EXIT}	100	-	-	ns
	Time to drive LP-00 to prepare for HS transmission	T _{CLK-PREPARE}	38	-	95	ns
	Time-out at Clock Lane Display Module to enable HS Termination	T _{CLK-TERM-EN}	-	-	38	ns
	Minimum lead HS-0 drive period before starting Clock	T _{CLK-PREPARE} + T _{CLK-ZERO}	300	-	-	ns
	Time that the HS clock shall be driven prior to any associated data Lane beginning the transition from LP to HS mode	T _{CLK-PRE}	8xUI			

Table 7.7: Clock Lanes High Speed Mode to/from Low Power Mode Timing



5. OPTICAL CHARACTERISTICS

(LCD optical characteristics)

Item	Symbol	Conditions	Specifications			Unit	Note
			Min.	Typ.	Max.		
Transmittance (without DBEF)	T%	Viewing normal angle x = y = 0		3.5	--	%	All left side data are based on INX's following condition (at 25 °C) 1.LC : AAS 2.Light Source : INX BLU Spectrum. 3.CF / TFT side Film : SRW062APN1HC5 / SRW062APN1 4.Machine : DMS 803 (Cono Scope for View Angle) 5. VLC white > 4.5 V VLC dark < 0.2 V
Contrast Ratio	CR		600	1000	--	--	
Response Time	T _{on} +T _{off}		--	25	35	ms	
Viewing Angle	Hor.	x+	75	80	--	deg.	
		x-	75	80	--		
	Ver.	y+	75	80	--		
		y-	75	80	--		
CF Only Color Chromaticity (CIE1931)	Red	X _R	0.635	0.655	0.675	--	Under C light simulation
		Y _R	0.301	0.321	0.341		
	Green	X _G	0.237	0.257	0.277		
		Y _G	0.539	0.559	0.579		
	Blue	X _B	0.119	0.139	0.159		
		Y _B	0.071	0.091	0.111		
	White	X _W	0.274	0.294	0.314		
		Y _W	0.294	0.314	0.334		
Color Gamut	CG		60	68	--	%	

*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L63 / L0$$

L63: Luminance of gray level 63

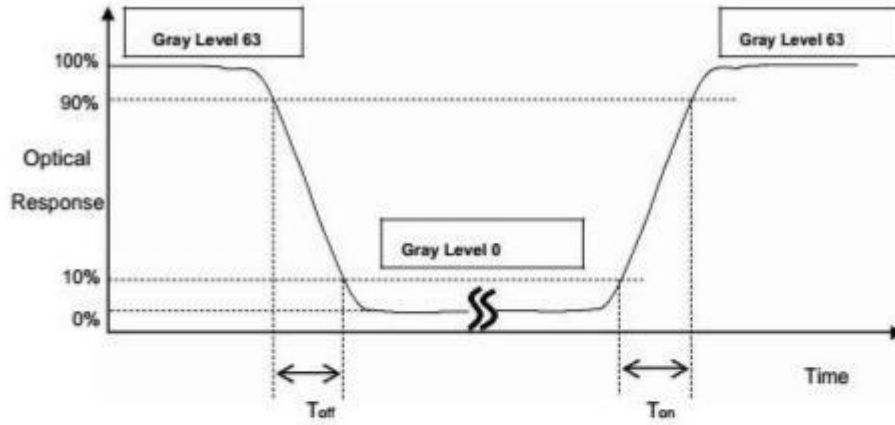
L 0: Luminance of gray level 0

$$\text{CR} = \text{CR} (5)$$

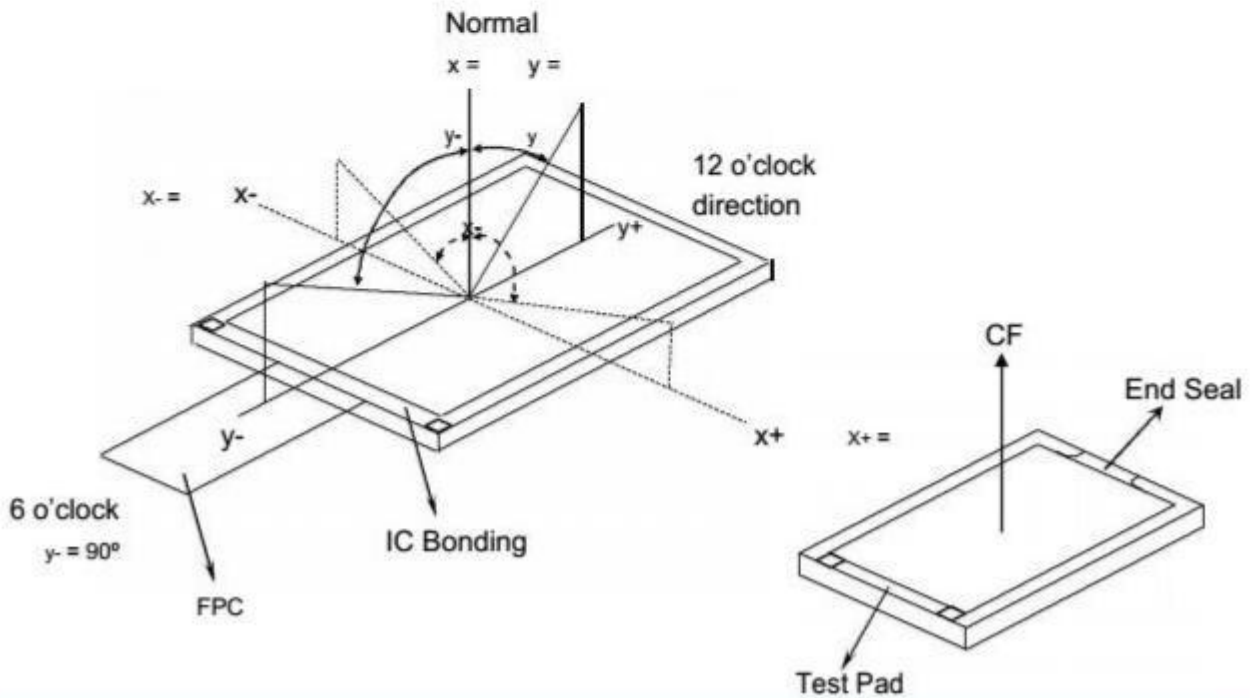
CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).



*Note (2) Definition of Response Time (T_{on} , T_{off}):



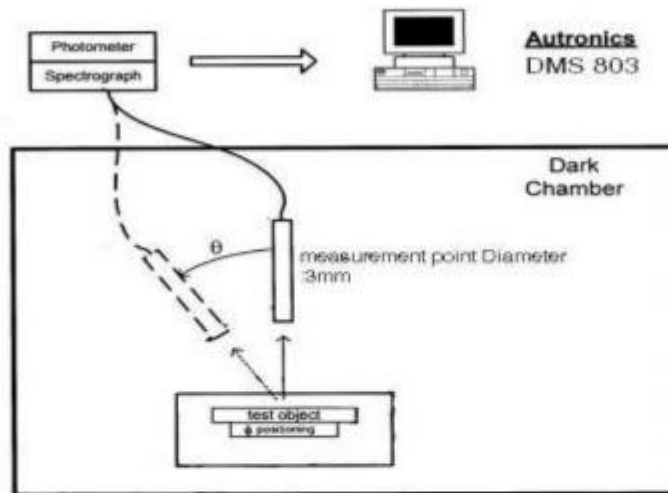
*Note(3) Definition of Viewing Angle



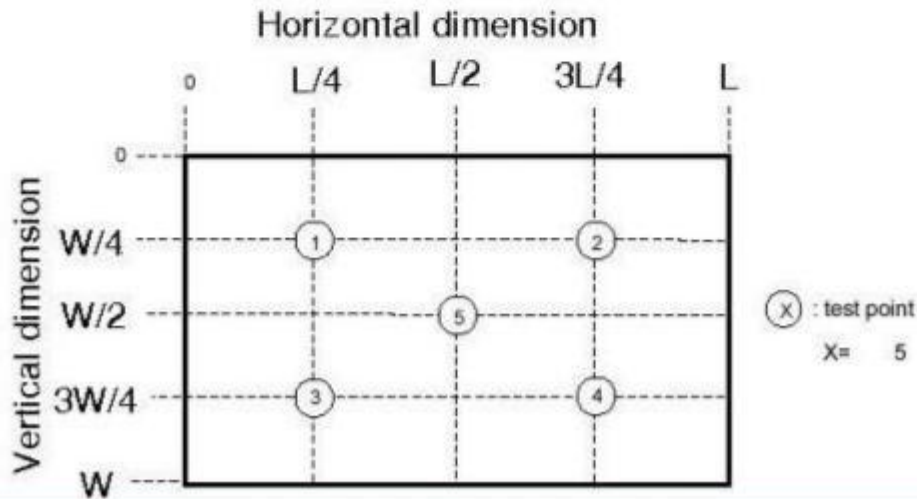


***Note (4) Measurement Set-Up:**

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.



***Note (5)**



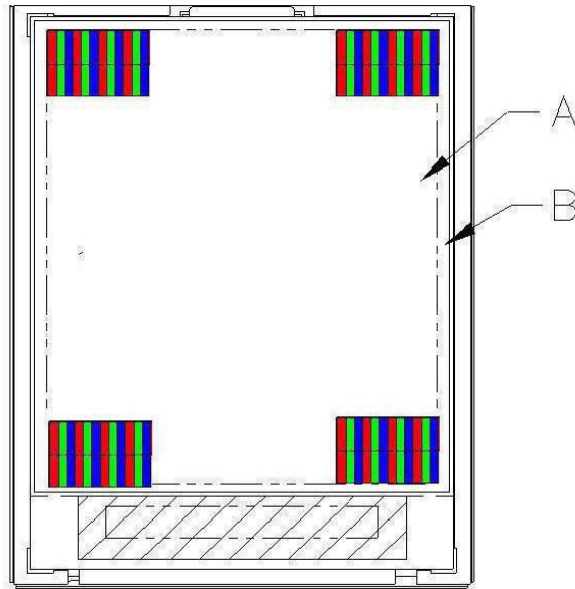


6. QUALITY SPECIFICATIONS

6.1 INSPECTION CONDITION

- (1) Inspect under 300~500Lux fluorescent light, leaving 30~35cm between panels and eyes, and between panels and lights.
- (2) Inspection condition is $23\pm 5^{\circ}\text{C}$, $50\pm 20\%RH$ maximum.

6.2 DEFINITION OF AREA





A Area : Viewing area.


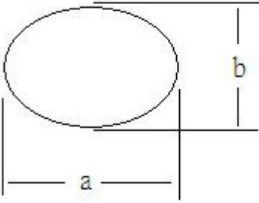
B Area : Out of viewing.(outside viewing area)



6.3 INSPECTION SPECIFICATION

NO	Item	Acceptable specification	Judgment Criterion
1	Electrical Testing	<p>1-1 sub pixel classification</p> <ul style="list-style-type: none"> Sub Pixel: Number of sub pixel doesn't exceed one dot.  <p>Sub Pixel (Dot)</p> <p>a> Dark dot ----one Allowed b> Bright dot ---- one Allowed</p> <ul style="list-style-type: none"> Pixel : Three dots link together doesn't exceed ones  <p>Pixel</p> <p>1-2Leakage to light</p> <ul style="list-style-type: none"> Leakage to light be not allowed. <p>1-3Picture to shake</p> <ul style="list-style-type: none"> Picture had shake, twinkle and noise etc. instable of defect that be not allowed. <p>1-4 Function</p> <ul style="list-style-type: none"> No display or No function. Source Line, Gate Line. Contrast Ratio Current consumption exceeds product specifications. Display malfunction. 	<p>$N \leq 2$</p> <p>$N \leq 0$</p> <p>$N=0$</p> <p>$N=0$</p> <p>$N=0$</p>
2	Mechanical Dimension	<p>2-1 Mechanical Dimension exceeds product specifications.</p> <p>2-2 Out of frame and boss of plastic changed shape that be not allowed.</p>	<p>$N=0$</p>



NO	Item	Acceptable specification	Judgment Criterion																																												
3	Cosmetic Inspection	<p>3-1 Blemish: Line shapes of defect</p> <table border="1" data-bbox="363 443 1316 797"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acceptable number</th> <th>Mini. space</th> </tr> </thead> <tbody> <tr> <td>---</td> <td>$W \leq 0.05$</td> <td>Ignore</td> <td rowspan="3">5 m m</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.05 < W \leq 0.08$</td> <td>4</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.08 < W \leq 0.15$</td> <td>3</td> </tr> <tr> <td>--</td> <td>$W > 0.15$</td> <td>Not allowed</td> <td>---</td> </tr> </tbody> </table> <p>L: length(mm) W: width(mm)</p>  <p>3-2 Blemish: dot shapes of defect.</p> <table border="1" data-bbox="435 1055 1286 1285"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Mini. Space</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.15$</td> <td>Ignore</td> <td>---</td> </tr> <tr> <td>$0.15 < \Phi \leq 0.20$</td> <td>3</td> <td rowspan="2">5 m m</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.30$</td> <td>2</td> </tr> <tr> <td>$\Phi > 0.30$</td> <td>0</td> <td>---</td> </tr> </tbody> </table> <p>3-3 Polarizer Bubble</p> <table border="1" data-bbox="435 1361 1286 1525"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Mini. Space</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.25$</td> <td>Ignore</td> <td>---</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.35$</td> <td>3</td> <td>15 m m</td> </tr> <tr> <td>$\Phi > 0.35$</td> <td>0</td> <td>---</td> </tr> </tbody> </table> <p>Foreign Substances</p>  <p>$\Phi = (a+b)/2$</p>	Length	Width	Acceptable number	Mini. space	---	$W \leq 0.05$	Ignore	5 m m	$L \leq 3.0$	$0.05 < W \leq 0.08$	4	$L \leq 3.0$	$0.08 < W \leq 0.15$	3	--	$W > 0.15$	Not allowed	---	Dimension	Acceptable number	Mini. Space	$\Phi \leq 0.15$	Ignore	---	$0.15 < \Phi \leq 0.20$	3	5 m m	$0.20 < \Phi \leq 0.30$	2	$\Phi > 0.30$	0	---	Dimension	Acceptable number	Mini. Space	$\Phi \leq 0.25$	Ignore	---	$0.25 < \Phi \leq 0.35$	3	15 m m	$\Phi > 0.35$	0	---	
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NO	Item	Acceptable specification				Judgment Criterion
3	Cosmetic Inspection	3-4 Scratch ● Sensate scratch not allowed. ● Impassive scratch as below.				
		Length	Width	Acceptable number	Mini. space	
		-----	$W \leq 0.05$	Ignore	5 m m	
		$L \leq 3.0$	$0.05 < W \leq 0.08$	4		
		$L \leq 3.0$	$0.08 < W \leq 0.15$	3		
		----	$0.15 < W$	Not allowed	---	
		$L > 3.0$	----	Not allowed		
		4	Package	4-1 Mixed product types 4-2 Shipping q'ty should be the same as "shipping notice form" q'ty. 4-3 Outer box can't broken.		
5	LCD Mura	LCD Mura according to ND 5% keep out to determine, if keep out distance at 30cm be seen by eyes is NG, otherwise will be ok if invisible.				



7. RELIABILITY

Test Item	Test Condition
High Temperature Operation	70°C for 96 hours
Low Temperature Operation	-20°C for 96 hours
High Temperature Storage	80°C for 96 hours
Low Temperature Storage	-30°C for 96 hours
High Temperature Operation Humidity Operation	60°C, 90%RH for 72 hours
Thermal Shock	-10°C (30min) ~+25°C (5min)~ +60°C (30min) for 10 cycles
Vibration Test (No Operation)	Frequency: 10~55Hz Amplitude:1.0mm Sweep Time: 11min Test Period: 6 Cycles for each direction of X, Y, Z
Static electricity test	Touch 4KV, air touch 8KV



8. HANDLING PRECAUTION

8.1 SAFETY

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

8.2 STORAGE CONDITIONS

- (1) Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and the humidity is below $50\pm 20\% \text{RH}$.
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.

8.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (6) Do not use ketonic solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.

8.4 WARRANTY

- 1) The period is within twelve months since the date of shipping out under normal using and storage conditions.
- 2) According to KINGTECH TFT LCD quality standard, KINGTECH will rework or exchange for functional defect goods since within one year.