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E-mail: Helen@kingtechgroup.cn TEL: 86-755- 23037763 Mobile: +86-139-2528-0716 Web: www.kingtechgroup.cn

SPECIFICATION
FOR
LCD Module

PV04303TD25E

CUSTOMER	INITIAL	DATE
APPROVED BY		

REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2018.5.21	-	First Issued.	YANG

TABLE OF CONTENTS

1. General Description

* DESCRIPTION

PV04303TD25E 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 4.3" TFT-LCD contains 480 x 800 pixels, and can display up to 16.7M colors.

*** Features**

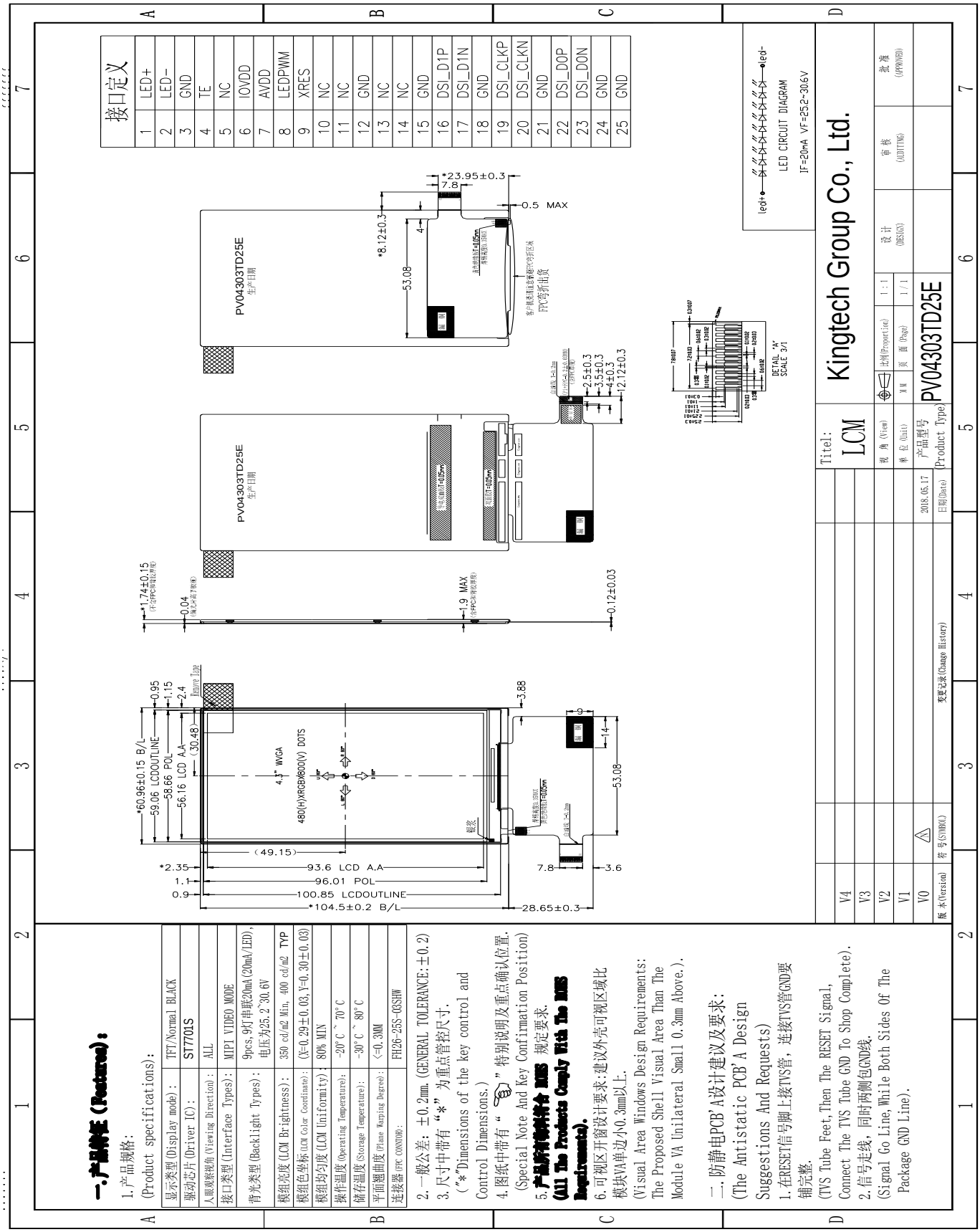
-Low Input Voltage: VCC: 2.5~3.6V; IOVCC: 1.65~3.6V
-Display Colors of TFT LCD: 16.7M colors
-CPU Interface: MIPI 2CH
-Internal Power Supply Circuit.

General Information Items	Specification	**Unit**	**Note**
	Main Panel		
Display area(AA)	56.16(H) *93.60(V) (4.3 inch)	mm	-
Driver element	a-Si TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	480(RGB) *800	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.117(H) *0.117(V)	mm	-
Viewing angle	ALL	o'clock	-
Drive IC	ST7701S	-	-
Display mode	Normally Black	-	-
Operating temperature	-20～+70	℃	-
Storage temperature	-30～+80	℃	-

Mechanical Information

Item		**Min.**	**Typ.**	**Max.**	**Unit**	**Note**
Module size	Horizontal(H)	-	60.96	-	mm	±0.15
	Vertical(V)	-	104.50	-	mm	±0.2
	Depth(D)	-	1.74	-	mm	±0.15
Weight		-	23	-	g	-

2. MECHANICAL SPECIFICATION



一.产品规格 (Features):

1.产品规格:
(Product specifications):

显示类型(Display mode):	TFT/Normal BLACK
驱动芯片(Driver IC):	ST7701S
人眼观察视角(Viewing Direction):	ALL
接口类型(Interface Types):	MIPI VIDEO MODE
背光类型(Backlight Types):	9pcs, 9灯串联20mA/(20mA/LED), 电压为25.2~30.6V
模组亮度(LCM Brightness):	350 cd/m2 Min, 400 cd/m2 TYP
模组色坐标(LCM Color Coordinate):	(X=0.29±0.03, Y=0.30±0.03)
模组均匀度(LCM Uniformity):	80% MIN
操作温度(Operating Temperature):	-20°C ~ 70°C
储存温度(Storage Temperature):	-30°C ~ 80°C
平面翘曲度(Plane Warping Degree):	<=0.30M
连接器(FPC CONNTOR):	FH26-25S-0.5SHW

2. 一般公差: ±0.2mm.(GENERAL TOLERANCE:±0.2)
3. 尺寸中带有"*"为重点管控尺寸.
("*"Dimensions of the key control and Control Dimensions.)
4. 图纸中带有"☜"特别说明及重点确认位置.
(Special Note And Key Confirmation Position)
5. **产品所有要求符合 ROHS 规定要求.**
(All The Products Comply With The ROHS Requirements).
6. 可视区开窗设计要求:建议外壳可视区域比模块VA单边小0.3mm以上.
(Visual Area Windows Design Requirements: The Proposed Shell Visual Area Than The Module VA Unilateral Small 0.3mm Above.).

二.防静电PCB'A设计建议及要求:
(The Antistatic PCB'A Design Suggestions And Requests)
1.在RESET信号脚上接TVS管,连接TVS管GND要铺完整.
(TVS Tube Feet, Then The RESET Signal, Connect The TVS Tube GND To Shop Complete).
2.信号走线,同时两侧包GND线.
(Signal Go Line, While Both Sides Of The Package GND Line).

3. PIN DESCRIPTION

Pin NO.	Symbol	Level	Function
1	LEDA	H	Backlight+
2	LEDK	L	Backlight-
3	GND	L	Ground
4	TE	H/L	Tearing effect output
5	NC	/	Not Connect
6	IOVCC	H	Power supply
7	VCC	H	Power supply
8	LEDPWM		LCD Backlight Control PWM Signal
9	RESET	H/L	Hardware reset pin
10-11	NC	/	Not Connect
12	GND	L	Ground
13-14	NC	/	Not Connect
15	GND	L	Ground
16	D1P	H/L	HSSI_D1+ are differential data signal line.
17	D1N	H/L	HSSI_D1- are differential data signal line.
18	GND	L	Ground
19	CLKP	H/L	HSSI_CLK+ are differential data signal line.
20	CLKN	H/L	HSSI_CLK- are differential data signal line.
21	GND	L	Ground
22	D0P	H/L	HSSI_D0+ are differential data signal line.
23	D0N	H/L	HSSI_D0- are differential data signal line.
24-25	GND	L	Ground

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min	Max.		
Supply Voltage for Logic circuit	VDDIO	1.65	3.6	V	
Supply Voltage for analog circuit	VCC	2.5	3.6	V	

4.2 DC ELECTRICAL CHARACTERISTICS

4.2.1 OPERATING CONDITIONS

Typical Operating Conditions (Ta=25℃)

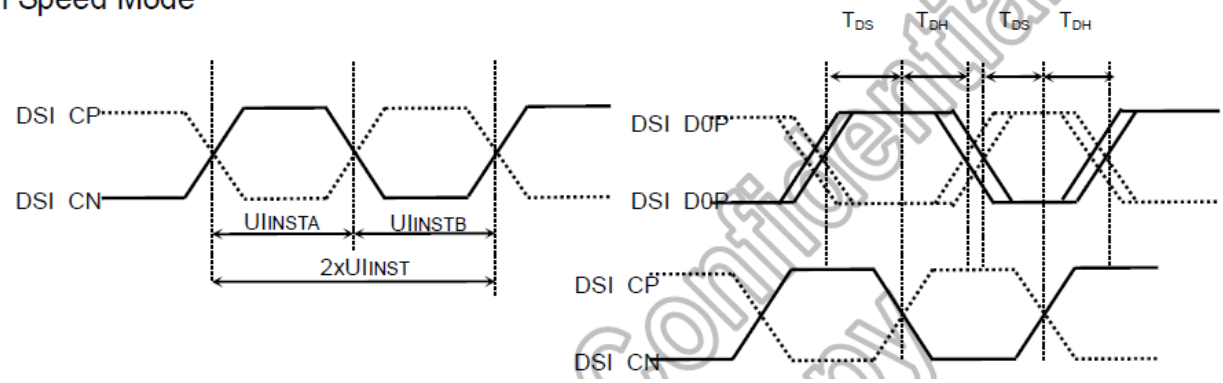
Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Power Supply	VCC	2.5	-	3.6	V	
Power Supply	VDDIO	1.65	1.8	3.6	V	
Normal mode Current consumption	Icc	-	45	55	mA	V_{CC}=2.8V
TFT Gate ON Voltage	V_{GH}	10	-	18	V	
TFT Gate OFF Voltage	V_{GL}	-15	-	-10	V	

4.2.2 BACKLIGHT UNIT (GND=0V)

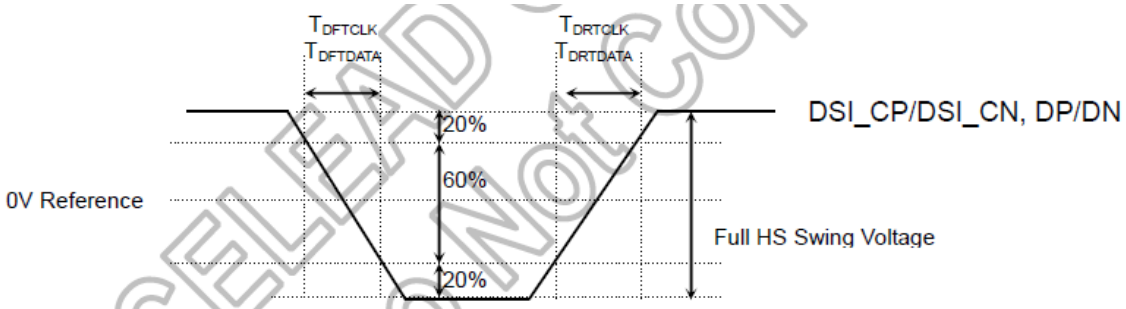
Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Forward supply Voltage	V_f	25.2	-	30.6	V	
Forward supply Current	I_f	-	20	-	mA	
LCM Luminance	L_V	350	400	–	cd/m2	I_B=20mA
Uniformity	/	80			%	-

4.3.1 TIMING CHARACTERISTICS

High Speed Mode



DSI clock Timing Characteristics



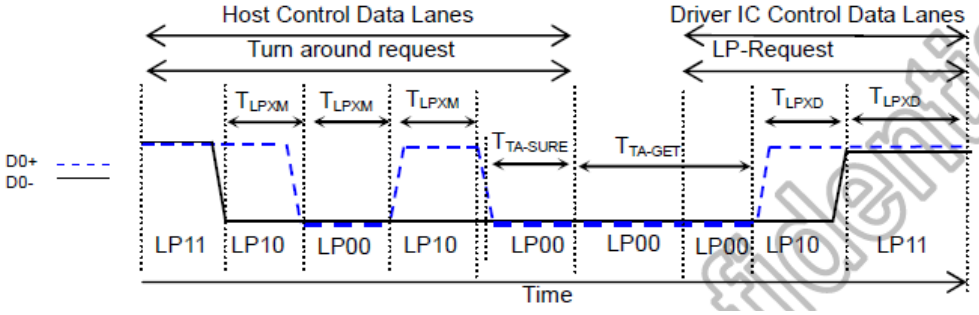
Rising and falling time on clock and data channel

(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.5V to 3.3V, T_A = -30 to 70℃)

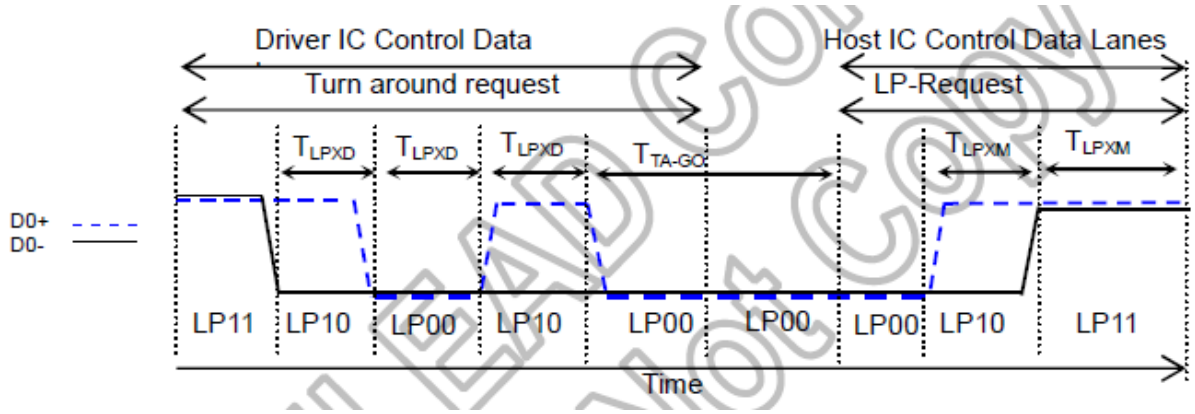
Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Double UI instantaneous	2xUINST	TBD	-	25	ns
	UI instantaneous	UINSTA UINSTB	TBD	-	12.5	ns
DP/DN	Data to clock setup time	T_{DS}	0.15xUI	-	-	ps
	Data to clock hold time	T_{DH}	0.15xUI	-	-	ps
DSI_CP/ DSI_CN	Differential rise time for clock	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

DSI High Speed Mode characteristics

Low Power Mode



BTA from HOST to Display module Timing



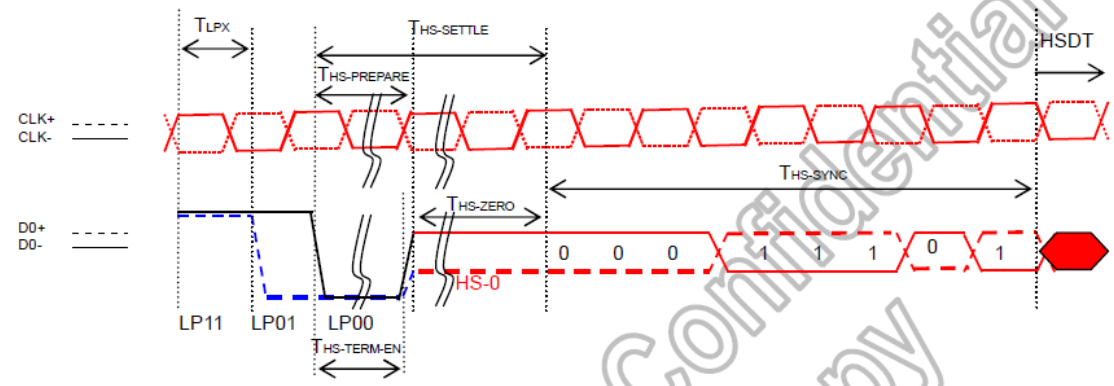
BTA from Display module Timing to HOST

(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.3V to 3.3V, T_A = -30 to 70℃)

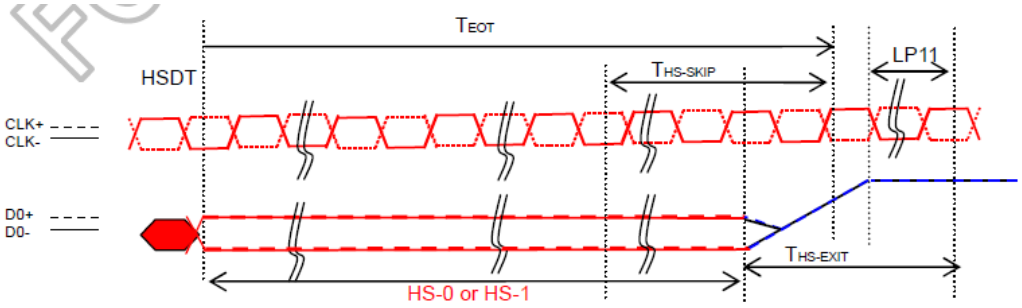
Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Length of LP-00/LP01/LP10/LP11 Host→ Display module	T_{LPXM}	50	-	-	ns
	Length of LP-00/LP01/LP10/LP11 Display module →Host	T_{LPXD}	50	-	-	ns
	Time-out before the MPU start driver	$T_{TA-SURE}$	T_{LPXD}	-	2xT_{LPXD}	ns
	Time to drive 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

DSI Low Power Mode characteristics

DSI BURSTS

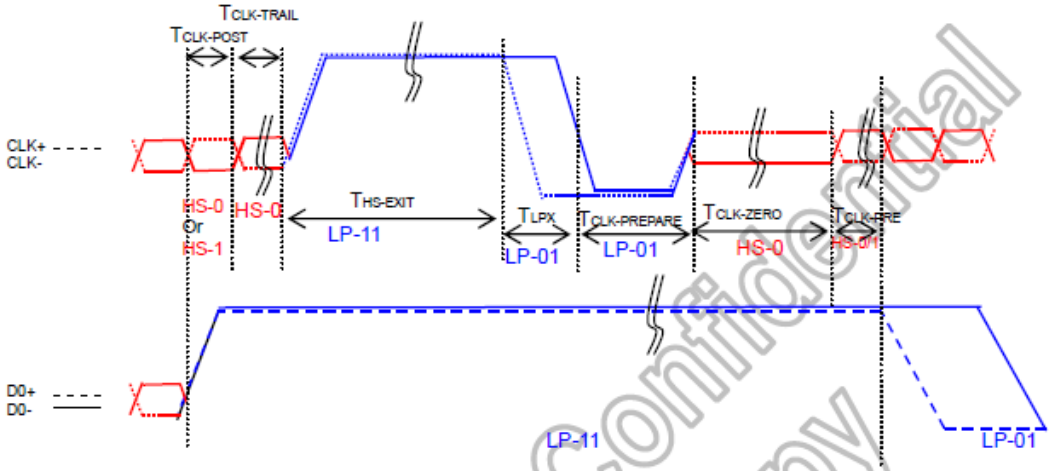


Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Length of LP-00/LP01/LP10/LP11	T_{LPX}	50	-	-	ns
	Time to Driver LP-00 to prepare for HS transmission	$T_{HS-PREPARE}$	40+4UI	-	85+6UI	ns
	Time to enable data receiver line termination	$T_{HS-TERM-EN}$	-	-	35+4xUI	ns
	Time to drive LP-00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



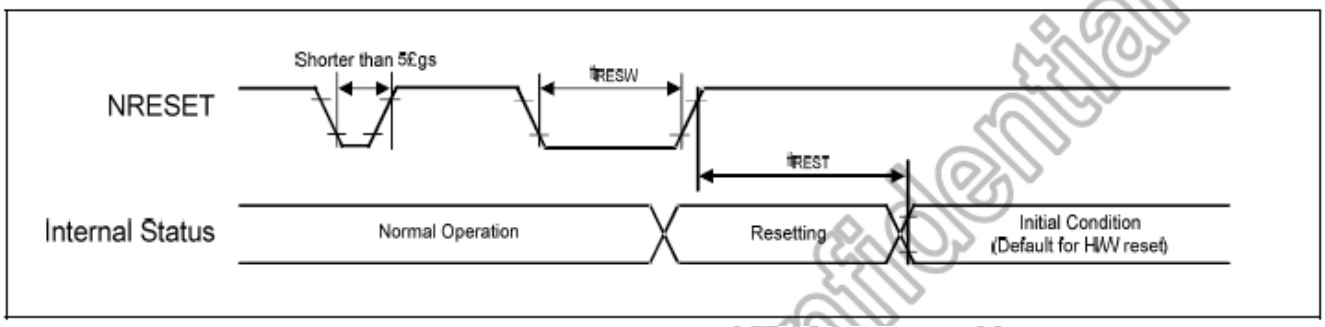
NOTE:
If the last bit is HS-0, the transmitter changes from HS-0 to HS-1
If the last bit is HS-0, the transmitter changes from HS-1 to HS-0

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



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	TCLK-POST	60+52xUI	-	-	ns
	Time to drive HS differential state after last payload clock bit of a HS transmission burst	TCLK-TRAIL	60	-	-	ns
	Time to drive LP-11 after HS burst	THS-EXIT	100	-	-	ns
	Time to drive LP-00 to prepare for HS transmission	TCLK-PREPARE	38	-	95	ns
	Time-out at Clock Lane Display Module to enable HS Termination	TCLK-TERM-EN	-	-	38	ns
	Minimum lead HS-0 drive period before starting Clock	TCLK-PREPARE + TCLK-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	TCLK-PRE	8xUI			

4.3.2. Reset input timing



Symbol	Parameter	Related Pins	Spec.			Note	Unit
			Min.	Typ.	Max.		
tRESW	Reset low pulse width(1)	NRESET	10	-	-	-	µs
tREST	Reset complete time(2)	-	5	-	-	When reset applied during SLPIN mode	ms
		-	120	-	-	When reset applied during SLPOUT mode	ms

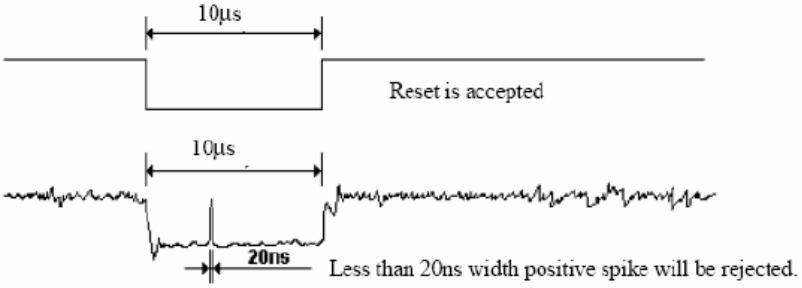
Note: (1) Spike due to an electrostatic discharge on NRESET line does not cause irregular system reset according to the following table.

NRESET Pulse	Action
Shorter than 5 µs	Reset Rejected
Longer than 10 µs	Reset
Between 5 µs and 10 µs	Reset Start

(2) During the resetting period, the display will be blanked (The display is entering blanking sequence, which Maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode) and then return to Default condition for H/W reset.

(3) During Reset Complete Time, ID and VCOM value in OTP will be latched to internal register during this period. This loading is done every time when there is H/W reset complete time (tREST) within 5ms after a rising edge of NRESET.

(4) Spike Rejection also applies during a valid reset pulse as shown as below:



(5) It is necessary to wait 5msec after releasing NRESET before sending commands. Also Sleep Out command cannot be sent for 120msec.

5. OPTICAL CHARACTERISTICS

The test of Optical specifications shall be measured in a dark room (ambient luminance ≤ 1lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. The center of the measuring spot on the Display surface shall stay fixed.

The backlight should be operating for 30 minutes prior to measurement.

<Table 4. Optical Specifications>

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle	θ_L	C.R. ≥ 10	70	80	-	degree
	θ_R		70	80	-	
	θ_U		70	80	-	
	θ_D		70	80	-	
Contrast Ratio	-	T = 25℃	650	800	-	-
Transmittance	T%(with polarizer+ D65 light)	T = 25℃	4.1	4.3	-	%
Response time	Tr	T = 25℃	35		40	ms
	Tf					

MDL Chromaticity Specification (CIE 1931)

Item	Symbol	Condition	Min.	Typ.	Max.
Red Color	Ru'	T=25℃ (CF、C light)	0.603	0.623	0.643
	Rv'		0.321	0.341	0.361
Green Color	Gu'		0.305	0.325	0.345
	Gv'		0.600	0.620	0.640
Blue Color	Bu'		0.130	0.150	0.170
	Bv'		0.036	0.056	0.076
White Color	Wu'		0.275	0.295	0.315
	Wv'		0.302	0.322	0.342
Black Color	Ku'		-	-	-
	Kv'		-	-	-
NTSC	%		73.5%	68.5%	-

CF Chromaticity Specification (CIE 1931)

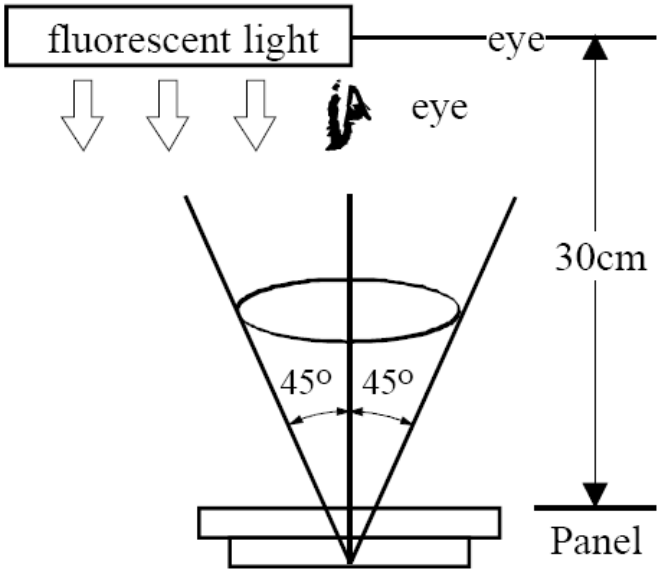
Item	Symbol	Condition	Min.	Typ.	Max.
Red Color	Rx	T=25℃ (CF、C light)	0.625	0.645	0.665
	Ry		0.302	0.322	0.342
Green Color	Gx		0.257	0.277	0.297
	Gy		0.572	0.592	0.612
Blue Color	Bx		0.115	0.135	0.155
	By		0.078	0.098	0.118
White Color	Wx		0.280	0.300	0.320
	Wy		0.313	0.333	0.353
Black Color	Wx		–	-	–
	Wy		–	-	–
NTSC	%		64.7%	69.7%	74.7%

NOTE：(1).Base on Normal Polarizer: Viewing angle、Contrast ratio、Response time. (The front and rear polarizer need to cross.)

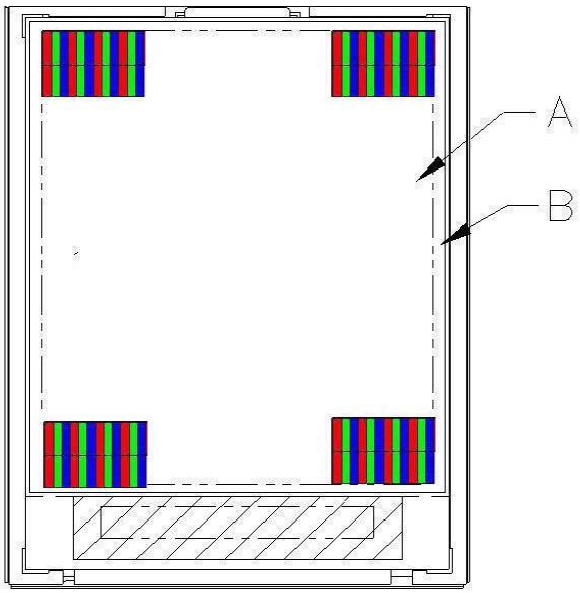
6. QUALITY SPECIFICATIONS

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±5°C, 50±20%RH maximum.

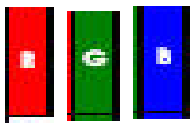
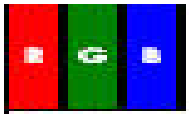


6.2 DEFINITION OF AREA



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	**1-1 sub pixel classification** ● Sub Pixel: Number of sub pixel doesn't exceed one dot.  **Sub Pixel (Dot)** **a> Dark dot ----one Allowed** **b> Bright dot ---- one Allowed**	N≦2
		● Pixel : Three dots link together doesn't exceed ones  **Pixel**	N≦0
		1-2 Leakage to light ● Leakage to light be not allowed.	N=0
		1-3 Picture to shake ● Picture had shake, twinkle and noise etc. instable of defect that be not allowed.	N=0
		1-4 Function ● No display or No function. ● Source Line, Gate Line. ● Contrast Ratio ● Current consumption exceeds product specifications. ● Display malfunction.	N=0
2	Mechanical Dimension	2-1 Mechanical Dimension exceeds product specifications. 2-2 Out of frame and boss of plastic changed shape that be not allowed.	N=0

<table>
<tr><th>NO</th><th>Item</th><th>Acceptable specification</th><th>Judgment Criterion</th></tr>
<tr><td>3</td><td>Cosmetic Inspection</td><td>

3-1 Blemish: Line shapes of defect

<table>
<tr><th>Length</th><th>Width</th><th>Acceptable number</th><th>Mini. space</th></tr>
<tr><td>---</td><td>W≦0.05</td><td>Ignore</td><td rowspan="3">5 m m</td></tr>
<tr><td>L≦3.0</td><td>0.05<W≦0.08</td><td>4</td></tr>
<tr><td>L≦3.0</td><td>0.08<W≦0.15</td><td>3</td></tr>
<tr><td>--</td><td>W＞0.15</td><td>Not allowed</td><td>---</td></tr>
</table>

L: length(mm)
W: width(mm)

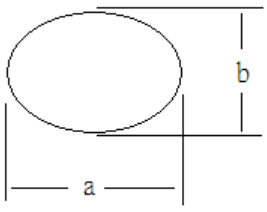
3-2 Blemish: dot shapes of defect.

<table>
<tr><th>Dimension</th><th>Acceptable number</th><th>Mini. Space</th></tr>
<tr><td>Φ≦0.15</td><td>Ignore</td><td>---</td></tr>
<tr><td>0.15＜Φ≦0.20</td><td>3</td><td rowspan="2">5 m m</td></tr>
<tr><td>0.20＜Φ≦0.30</td><td>2</td></tr>
<tr><td>Φ＞0.30</td><td>1</td><td>---</td></tr>
</table>

3-3 Polarizer Bubble

<table>
<tr><th>Dimension</th><th>Acceptable number</th><th>Mini. Space</th></tr>
<tr><td>Φ≦0.25</td><td>Ignore</td><td>---</td></tr>
<tr><td>0.25＜Φ≦0.35</td><td>3</td><td>15 m m</td></tr>
<tr><td>Φ＞0.35</td><td>1</td><td>---</td></tr>
</table>

Foreign Substances



Φ=(a+b)/2

</td><td></td></tr>
</table>

<table>
<tr><th>NO</th><th>Item</th><th>Acceptable specification</th><th>Judgment Criterion</th></tr>
<tr><td>3</td><td>Cosmetic Inspection</td><td>
3-4 Scratch
● Sensate scratch not allowed.
● Impassive scratch as below.
Unit:mm
<table>
<tr><th>Length</th><th>Width</th><th>Acceptable number</th><th>Mini. space</th></tr>
<tr><td>-----</td><td>W≦0.05</td><td>Ignore</td><td rowspan="3">5 m m</td></tr>
<tr><td>L≦3.0</td><td>0.05<W≦0.08</td><td>4</td></tr>
<tr><td>L≦3.0</td><td>0.08<W≦0.15</td><td>3</td></tr>
<tr><td>----</td><td>0.15＜W</td><td>Not allowed</td><td rowspan="2">---</td></tr>
<tr><td>L>3.0</td><td>----</td><td>Not allowed</td></tr>
</table>
</td><td></td></tr>
<tr><td>4</td><td>Package</td><td>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.</td><td>N=0</td></tr>
</table>

7. RELIABILITY

Test Item	Test Condition
High Temperature Operation	70℃ for 96 hours
Low Temperature Operation	-20℃ for 96 hours
High Temperature Storage	80℃ for 96 hours
Low Temperature Storage	-30℃ for 96 hours
High Temperature Operation Humidity Operation	60℃, 90%RH for 72 hours
Thermal Shock	-10℃(30min) ~+25℃(5min)~ +60℃(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 stal 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±5℃ and thehumidity is below 50±20%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 ketonics solvent & Aromatic solvent, use with a soft cloth soaked with acleaning 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 standrad,□Kingtech will rework or exchange for functional defect goods sine within one year.