SPECIFICATION
FOR
LCM Module
KD080FM-8-C008A

MODULE:	KD080FM-8-C008A
CUSTOMER:	

REV	DESCRIPTION	DATE
1.0	FIRST ISSUE	2017.09.04

STARTEK	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

Revision History

Date	Rev. No.	Page	Summary
2017.09.04	V1.0	ALL	FIRST ISSUE

Contents

* Description

This 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 8'TFT-LCD contains 1600X480 pixels, and can display up to 16.7M colors.

* Features

-Low Input Voltage: 3.3V(TYP)s

-Display Colors of TFT LCD: 16.7M colors

Interface: 6/8Bit LVDS Interface

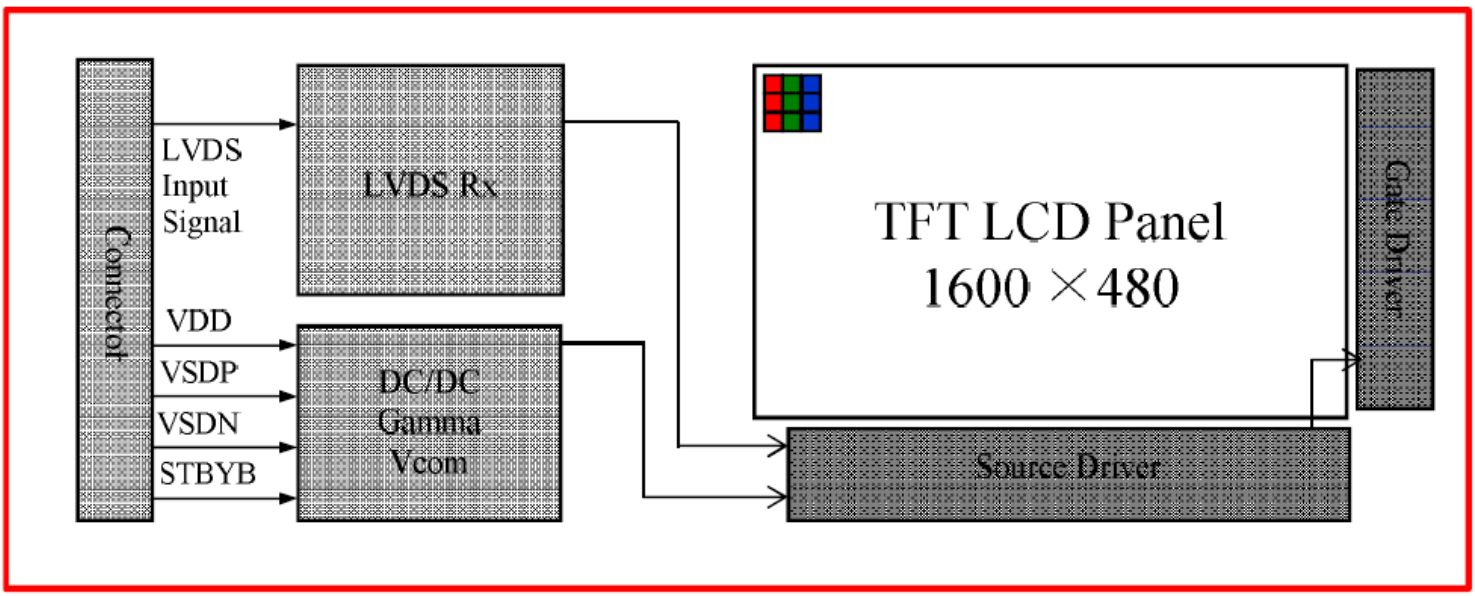
CTP Interface:USB

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	194.4(H) *58.32(V) (8.0inch)	mm	-
Driver element	TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	1600(RGB)*480	dots	-
TFT Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.1215 (H) x 0.1215(V)	mm	-
Viewing angle	All	o'clock	-
TFT Controller IC	HX8249 & HX8678	-	-
CTP Controller IC	FT5926QSM	-	
Display mode	Transmissive/Normally Black	-	-
Touch mode	Support to up 10 Points	-	-
Operating temperature	-20～+70	℃	-
Storage temperature	-30～+80	℃	-

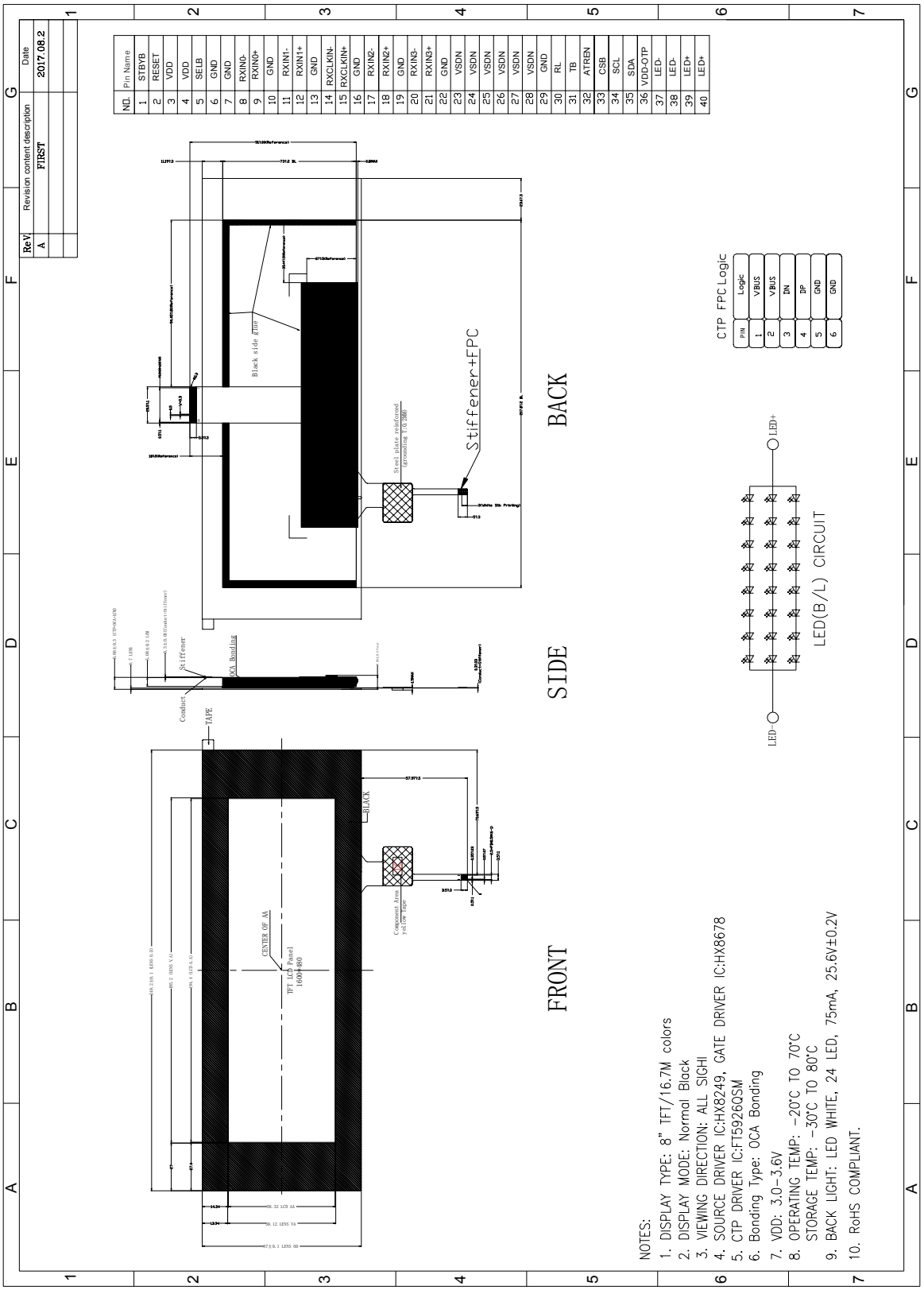
* Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		249.2		mm	-
	Vertical(V)		87		mm	-
	Depth(D)		6.86		mm	-
Weight			173		g	-

1. Block Diagram



2. Outline dimension



3. Input terminal Pin Assignment

3.1 TFT

NO.	SYMBOL	DISCRIPTION	I/O
1	STBYB	Enale IC	Note 1
2	Reset	Reset IC	Note 2
3	VDD	Digital power-3.3v	P
4	VDD	Digital power-3.3v	P
5	SELB	6bit/8bit mode select	Note 3
6	GND	Ground	P
7	GND	Ground	P
8	RXINO-	Negative LVDS differential data input	I
9	RXINO+	Positive LVDS differential data input	I
10	GND	Ground	P
11	RXIN1-	Negative LVDS differential data input	I
12	RXIN1+	Positive LVDS differential data input	I
13	GND	Ground	P
14	RXCLKIN-	Negative LVDS differential data input	I
15	RXCLKIN+	Positive LVDS differential data input	I
16	GND	Ground	P
17	RXIN2-	Negative LVDS differential data input	I
18	RXIN2+	Positive LVDS differential data input	I
19	GND	Ground	P
20	RXIN3-	Negative LVDS differential data input	I
21	RXIN3+	Positive LVDS differential data input	I
22	GND	Ground	P
23	VSDN	Power for Driver IC	P

24	VSDN	Power for Driver IC	P
25	VSDN	Power for Driver IC	P
26	VSDP	Power for Driver IC	P
27	VSDP	Power for Driver IC	P
28	VSDP	Power for Driver IC	P
29	GND	Ground	P
30	RL	Horizontal shift direction	Note 4
31	TB	Vertical shift direction	Note 4
32	ATREN	Only for OTP program	I
33	CSB	SPI	-
34	SCL	SPI	-
35	SDA	SPI	-
36	VDD-OTP	7.5V for OTP program	P
37	LED-	LED Cathode	P
38	LED-	LED Cathode	P
39	LED+	LED Anode	P
40	LED+	LED Anode	P

Note.1

STBYB=H(3.3V),normal operarion.

STBYB=L(GND),timing controller,source driver will rurn off,all opout are High-Z.

Note.2

Suggest to connection with an RC reset circuit for stability,Normally pull high.

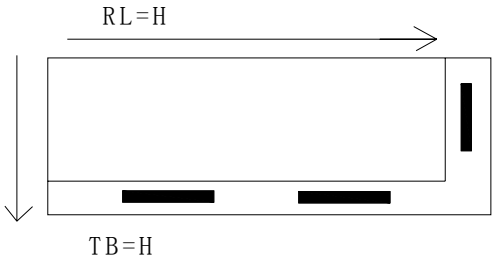
(47KΩ+0.1uF or extirnal MCU control)

Note.3

If LVDS iput data is 8 bit,SELB must be set to hight.

Note.4

Scan control Input		Scanning direcrion
RL	TB	
VDD	VDD	Up to Down,Left to Right
GND	VDD	Up to Down,Right to left
VDD	GND	Down to Up,Left to Right
GND	GND	Down to Up,Right to left.



3.2 CTP

NO.	SYMBOL	DISCRIPTION	I/O
1	VBUS	Supply voltage. (4.5-5.5V)	P
2	VBUS	Supply voltage. (4.5-5.5V)	P
3	DN	USB D-	I/O
4	DP	USB D+	I/O
5	GND	Ground.	P
6	GND	Ground.	P

4. LCD Optical Characteristicss

4.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	Θ=0 Normal viewing angle	700	900	--		
Response time	Rising	$T_{R+}T_F$		--	25	35	msec	
	Falling			--				
Color gamut		S(%)		45	50	--	%	
Color Filter Chromacicity	White	W_X		0.252	0.292	0.332		
		W_Y		0.255	0.295	0.335		
	Red	R_X		0.598	0.608	0.628		
		R_Y		0.329	0.349	0.369		
	Green	G_X		0.267	0.307	0.327		
		G_Y		0.527	0.547	0.567		
	Blue	B_X		0.122	0.142	0.162		
		B_Y		0.070	0.090	0.110		
Viewing angle	Hor.	Θ_L	CR>10	--	85	--		
		Θ_R		--	85	--		
	Ver.	Θ_U		--	85	--		
		Θ_D		--	85	--		
Option View Direction		ALL						

4.2 Measuring Condition

■ Measuring surrounding：dark room

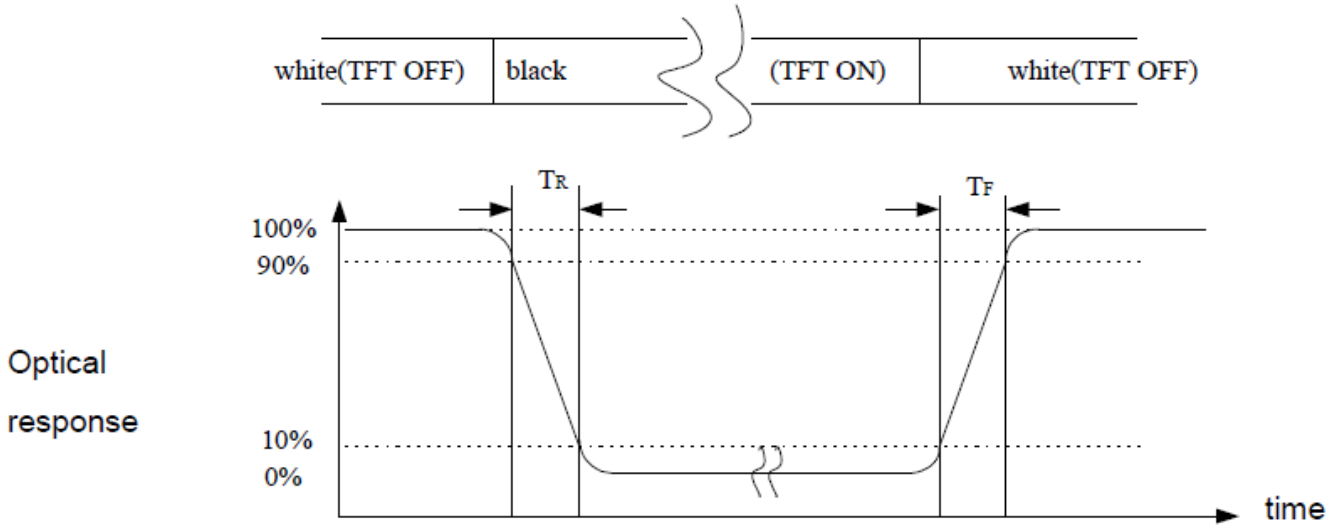
■ Ambient temperature：25±2℃

■ 15min. warm-up time.

Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3) Definition of Response Time : Sum of T_R and T_F



5. Electrical Characteristics

5.1 Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Max.	Unit
Digital Supply Voltage	VDD	2.8	3.6	**V**
Operating temperature	T_{OP}	-20	+70	℃
Storage temperature	T_{ST}	-30	+80	℃

NOTE: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

Characteristics		Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage		VDD	3.0	3.3	3.6	V	
Current consumption VDD		IDD	--	25	--	mA	
Supply Voltage IC& GAMA		VSDP	5.4	5.5	5.6	V	
Current consumption VSDP		IVSDP	--	25	--	mA	
Supply Voltage IC& GAMA		VSDN	-5.4	-5.5	-5.6	V	
Current consumption VSDN		IVSDN	--	25	--	mA	
CMOS Interface		VIH	2.6	-	3.3	V	
		VIL	GND	-	0.8	V	
LVDS Interface	Differential Input Hight Threshold Voltage	VLVTH	100	-	300	mV	
	Differential Input Low Threshold Voltage	VLVTL	-300	-	-100	mV	

	Common Input Voltage	VLVC	1	1.2	1.77-VID/2	V	
	Differential Input Voltage	VID	0.2	-	0.6	V	

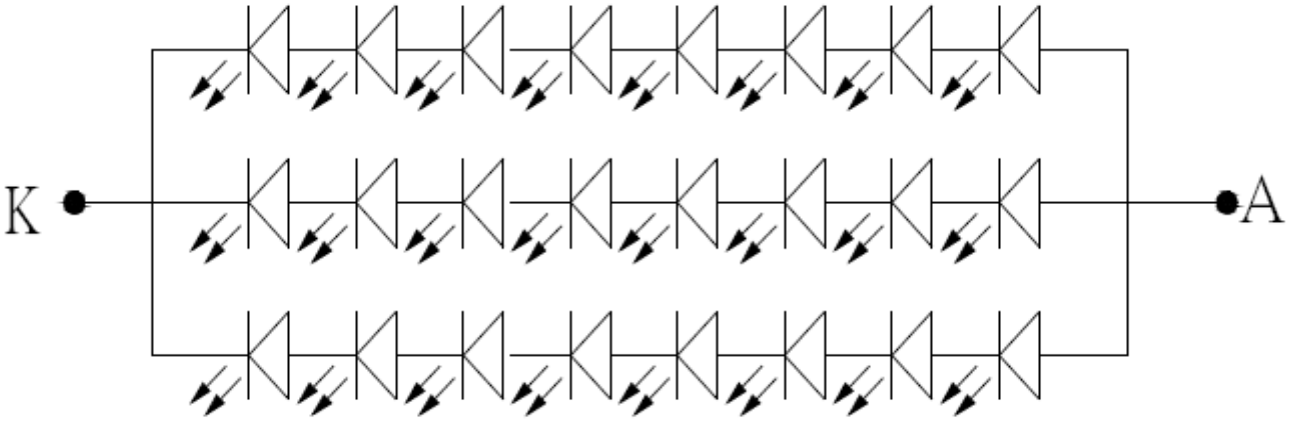
5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 24 chips White LED

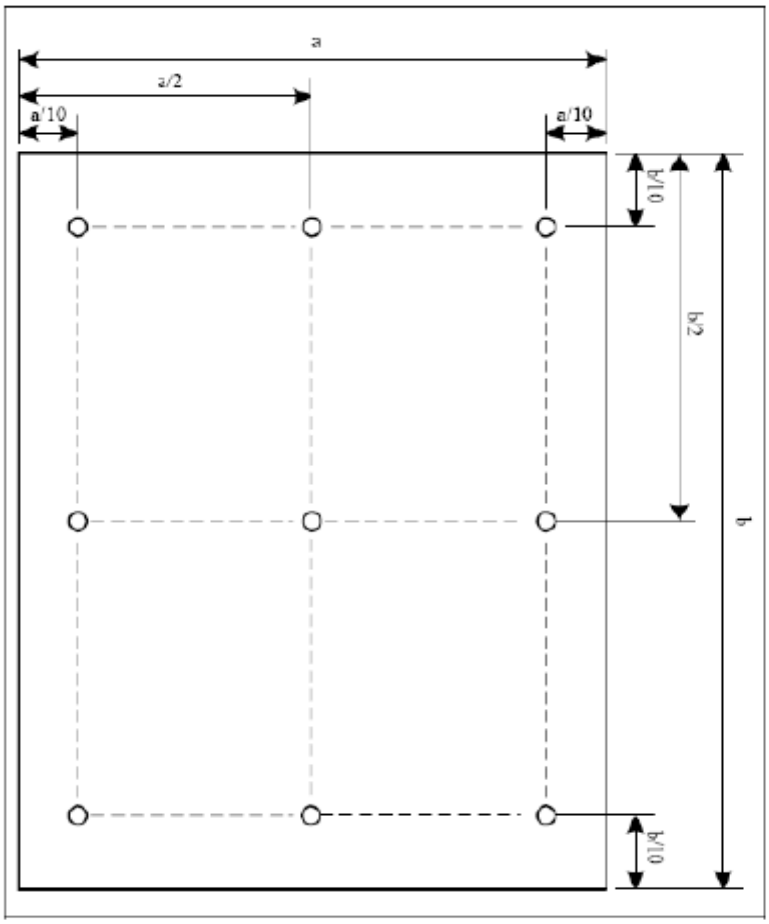
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	60	75	--	mA	
Forward Voltage	V_F	--	25.6	--	V	
LCM Luminance	L_V	375	425	--	cd/m2	Note3
LED life time	Hr	50000	--	--	Hour	Note1,2
Uniformity	AVg	80	--	--	%	Note3

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 ℃, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note (2) The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL=75mA. The LED lifetime could be decreased if operating IL is larger than 75mA. The constant current driving method is suggested.



NOTE 3：Luminance Uniformity of these 9 points is defined as below:



$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

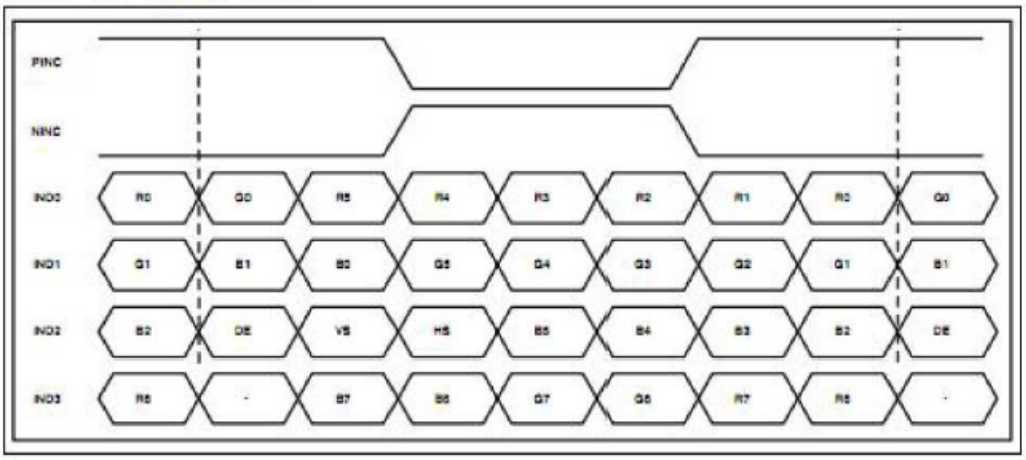
6.SIGNAL TIMING SPECIFICATIONS

6.1 Timing Parameters(Sync mode)

Parameter	Symbol	Value			Unit.	Note
		Min.	Typ.	Max.		
DCLK Frequency	FDCLK	48.69	52.59	60.83	MHz	
Horizontal valid data	thd		1600		DCLK	
Hsync Pulse Width	thpw	1	2	140	DCLK	
Hsync back porch	thbp	5	16	141	DCLK	
Hsync front porch	thfp	19	44	155	DCLK	
1 Horizontal Line	th	1656	1660	1760	DCLK	
Vertical valid data	tvd		480		H	
Vsync Pulse Width	tvpw	1	2	90	H	
Vsync back porch	tvbp	5	5	91	H	
Vsync front porch	tvfp	5	43	91	H	
1 Vertical field	tv	490	528	576	H	

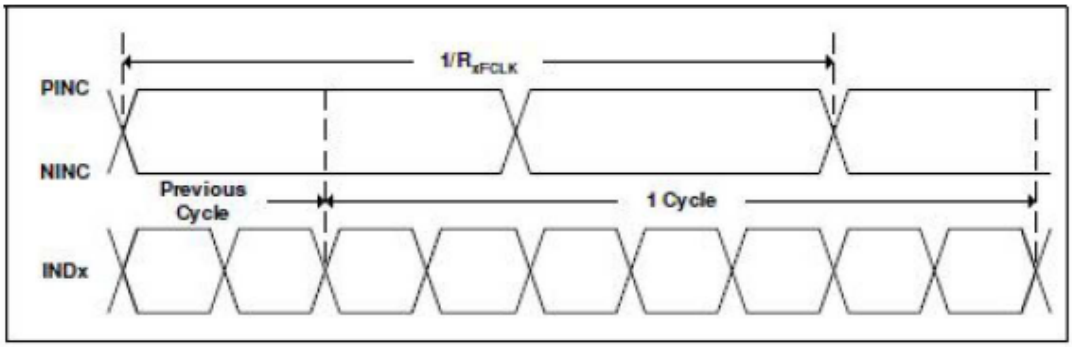
Notes: This product is Sync mode

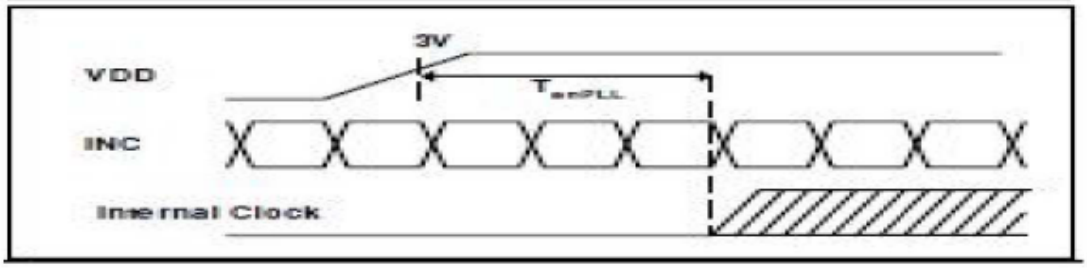
8-bit LVDS input (HSD='L')

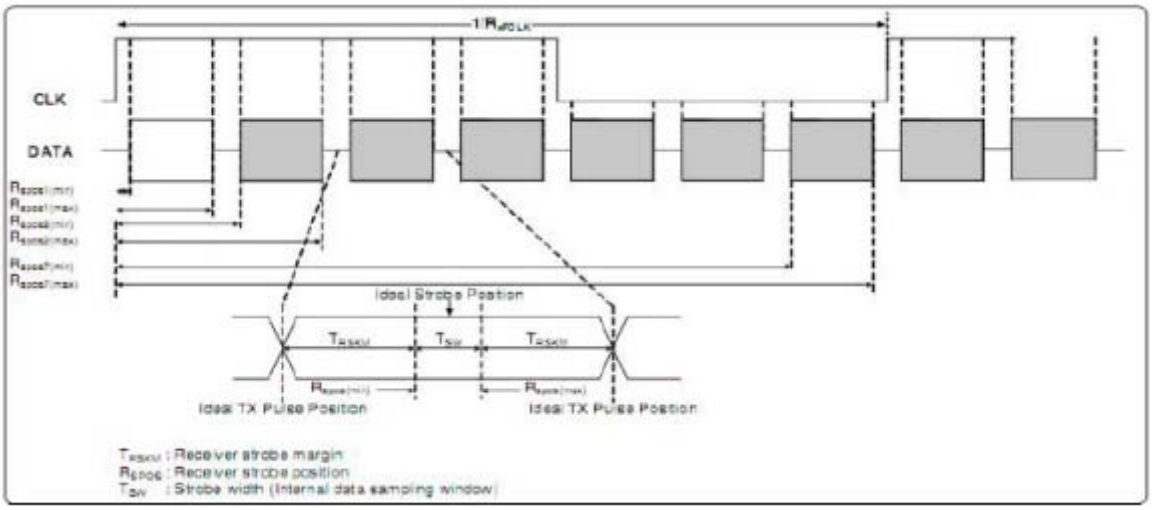


6.2 LVDS Rx Interface Timing Parameter

Parameter	Symbol	Value			Unit.	Condition
		Min.	Typ.	Max.		
Clock frequency	RxFCLK	TBD	TBD	TBD	MHz	
Input data skew margin	TRSKM	500	-	-	ps	|VID|=400mV, RxVCM=1.2V, RxFCLK=71MHz
Clock high time	TLVCH	-	4/(7*RxFCLK)	-	ns	
Clock low time	TLVCL	-	3/(7*RxFCLK)	-	ns	
PLL wake-up time	TenPLL	-	-	150	us	





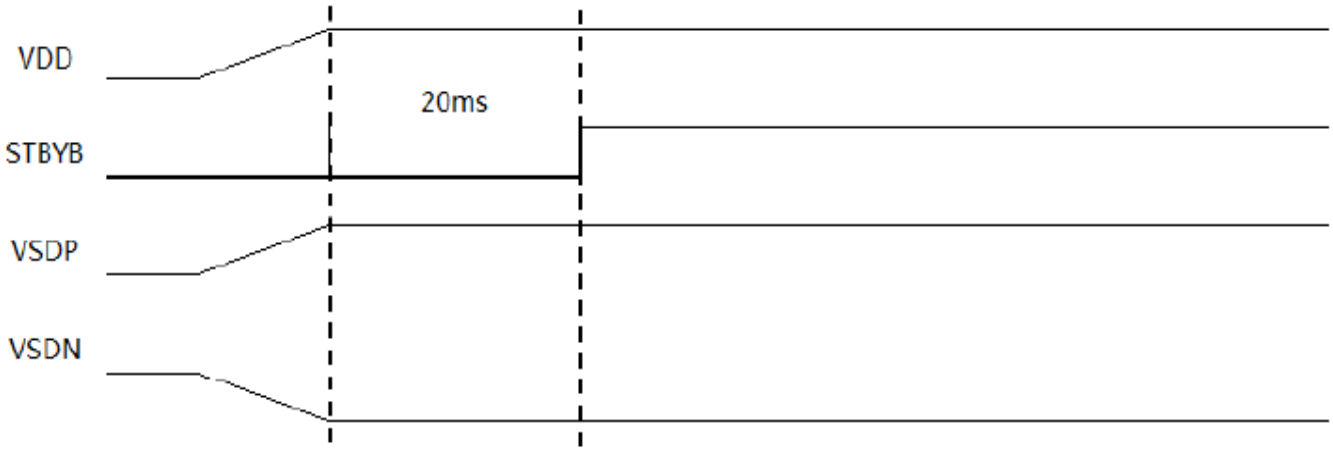


6.3 Input Signals,Basic Display Colors & Gray Scale Of Colors

Color & Gray Scale		Input Data Signal																							
		Red Data								Green Data								Blue Data							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	▽	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of White	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

6.4 Power Sequence

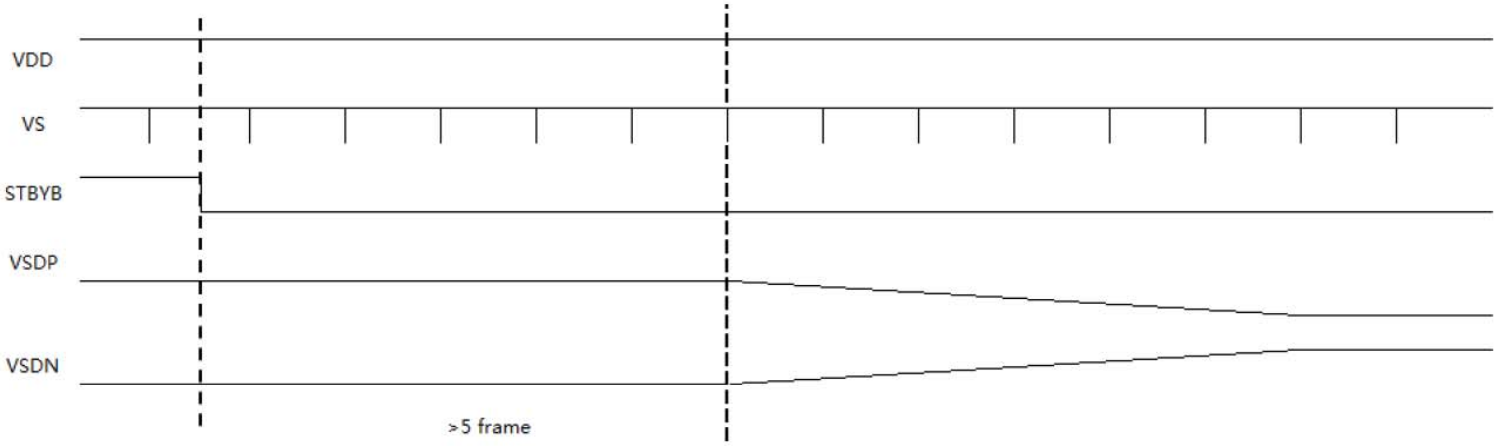
Power on Sequence



Notes:

1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

Power off Sequence



7. CTP Specification

7.1 Electrical Characteristics

7.1.1 Absolute Maximum Rating

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VBUS	4.0	6.0	V	--
Operating temperature	T_{OP}	-20	+70	℃	--
Storage temperature	T_{ST}	-30	+80	℃	--

7.1.2 DC Electrical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit	Note
Input high-level voltage	VIH		0.7x IOVCC	-	IOVCC	V	
Input low-level voltage	VIL		-0.3	-	0.3x IOVCC	V	
Output high-level voltage	VOH	IOH=-0.1mA	0.7x IOVCC	-	-	V	
Output low-level voltage	VOL	IOH=0.1mA	-	-	0.3x IOVCC	V	
I/O Leakage current	ILI	Vin=0~VDDA	-1	-	1	uA	
Normal operation mode Current consumption	Iopr	VDDA=VDD3=2.8V Ta=25℃ MCLK=24MHZ	-	16.68	-	mA	RMS
Green mode Current consumption	Imon	VDDA=VDD3=2.8V Ta=25℃ MCLK=24MHZ	-	8.56	-	mA	RMS
Sleep mode Current Consumption	Islp	VDDA=VDD3=2.8V Ta=25℃ MCLK=24MHZ	-	≤200	-	uA	RMS

Step-up output voltage	VDD5	VDDA=VDD3=2.8V	4.5	5.0	5.2	V	
Power supply voltage	VDD5 VDD3	-	2.8	-	3.6	V	
Power Consumption	-	-	–	16.68	–	mA	Active
	-	-	–	8.56	–	mA	Monitor
	-	-	–	187.5	–	uA	Sleep

7.1.3 POWER ON/Sequence

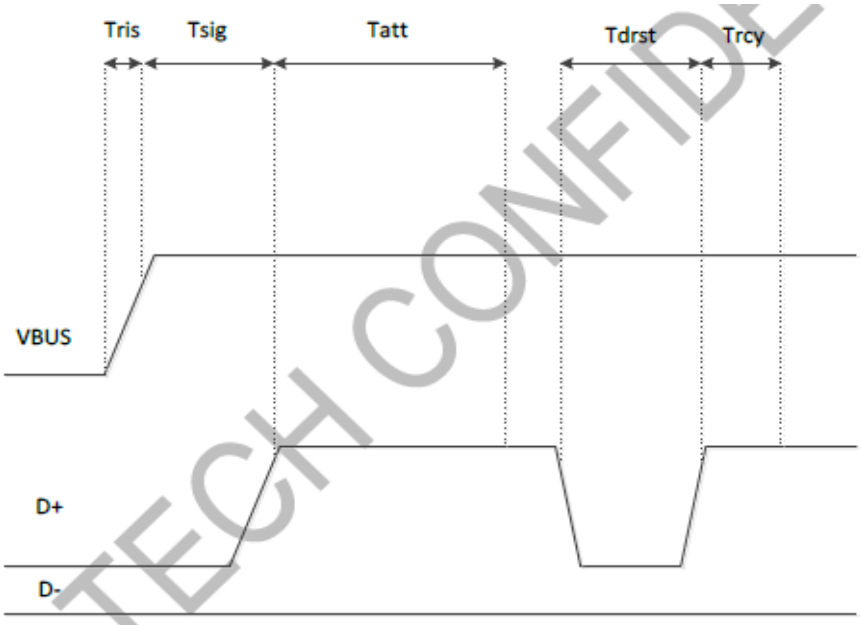


Figure 3-11 Power on / down Sequence

Table 3-7 USB Power on/Reset Sequence Parameters

Parameter	Description	Min	Max	Units
Tris	Rise time from 0.1VDD to 0.9VDD	--	5	ms
Tsig	Time required for the device internal power rail to stablilize and for D+ or D- to reach VIH (min)	100	--	ms
Tatt	Time ensures that the electrical and mechanical connection is stable before software attempts to reset the attached device	100	--	ms
Tdrst	Time hubs drive reset to a device	10	--	ms
Trcy	The USB System Software guarantees a minimum of 10 ms for reset recovery	10	--	ms

8. LCD Module Out-Going Quality Level

8.1 VISUAL & FUNCTION INSPECTION STANDARD

8.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

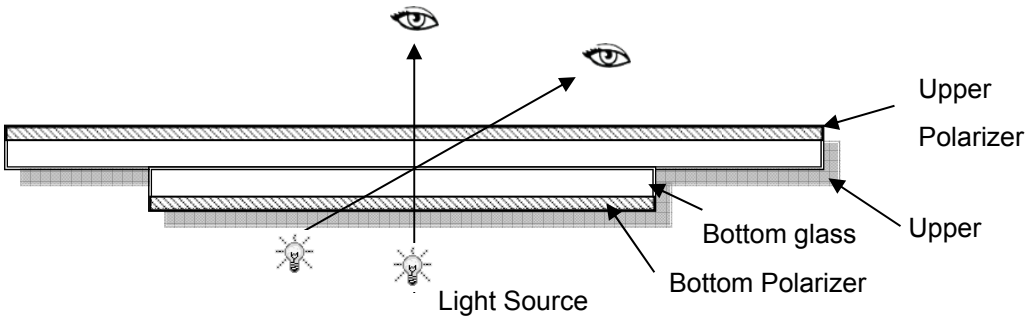
Temperature : 25±5℃

Humidity : 65%±10%RH

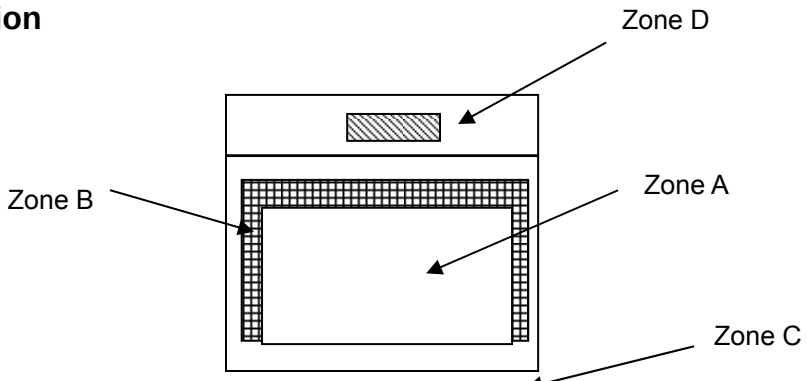
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



8.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C Cover (Zone A+Zone B) which can not be seen after assembly by customer .)

Zone D : IC Bonding Area

Note: As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer

8.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class Ⅱ

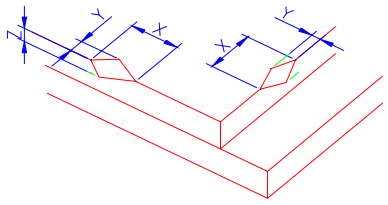
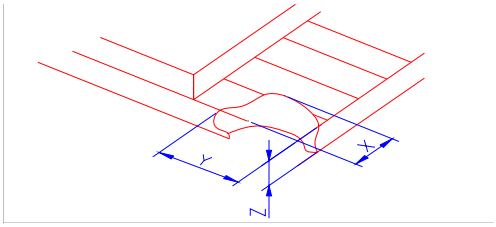
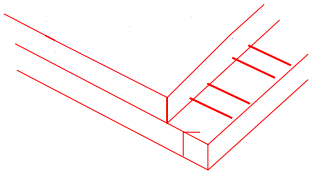
AQL:

Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

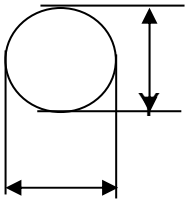
No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Spot Line defect	Light dot， Dim spot , Polarizer Bubble ; Polarizer accidented spot.	
6	Soldering appearance	Good soldering , Peeling off is not allowed.	
7	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

8.1.4 Criteria (Visual)

<table>
<tr><th>Number</th><th>Items</th><th>Criteria(mm)</th></tr>
<tr><td rowspan="3">1.0 LCD Crack/Broken
NOTE:
X: Length
Y: Width
Z: Height
L: Length of ITO,
T: Height of LCD</td><td>(1) The edge of LCD broken</td><td> 
<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≤3.0mm</td><td><Inner border line of the seal</td><td>≤T</td></tr>
</table></td></tr>
<tr><td>(2)LCD corner broken</td><td> 
<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≤3.0mm</td><td>≤L</td><td>≤T</td></tr>
</table></td></tr>
<tr><td>(3) LCD crack</td><td> 
Crack
Not allowed</td></tr>
</table>

2.0

Spot defect



X

Φ=(X+Y)/2

① light dot（LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain）

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.10	Ignore		Ignore
0.10<Φ≤0.25	4(distance≧10mm)		
0.25<Φ≤0.35	3		
Φ>0.4	0		

②Dim spot（LCD/TP/Polarizer dim dot, light leakage、dark spot）

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.1	Ignore		Ignore
0.10<Φ≤0.25	4(distance≧10mm)		
0.25<Φ≤0.35	3		
Φ>0.4	0		

③ Polarizer accidented spot

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.3<Φ≤0.5	3(distance≧10mm)		
Φ>0.5	1		

④Pixel bad points（light dot，Dim dot, color dot）

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.15	Ignore		Ignore
0.2<Φ≤0.3	2(distance≧10mm)		
Φ>0.4	1		

⑤ Polarizer Bubble

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.3<Φ≤0.4	4(distance≧10 m)		
0.4<Φ≤0.5	3		
Φ>0.5	1		

<table>
<tr><td>3.0</td><td>Line defect (LCD/TP /Polarizer backlight black/white line, scratch, stain)</td><td>
<table>
<tr><td rowspan="2">Width(mm)</td><td rowspan="2">Length(mm)</td><td colspan="3">Acceptable Qty</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Φ≤0.05</td><td>Ignore</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr>
<tr><td>0.05<W≤0.06</td><td>L≤4.0</td><td colspan="2">N≤3</td></tr>
<tr><td>0.07<W≤0.08</td><td>L≤3.0</td><td colspan="2">N≤2</td></tr>
<tr><td>0.08<W</td><td colspan="4">Define as spot defect</td></tr>
</table>
</td></tr>
<tr><td>4.0</td><td>Electronic Components SMT</td><td>Not allow missing parts，solderless connection，cold solder joint，mis match，The positive and negative polarity opposite</td></tr>
<tr><td>5.0</td><td>Display color& Brightness</td><td>1. Color：Measuring the color coordinates, The measurement standard according to the datasheet or samples.
2. Brightness：Measuring the brightness of White screen, The measurement standard according to the datasheet or Samples.</td></tr>
<tr><td rowspan="2">6.0</td><td rowspan="2">CTP Related</td><td>CTP Cover sensor accidented black/white spot</td><td>
<table>
<tr><td rowspan="2">Size Φ(mm)</td><td colspan="3">Acceptable Qty</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Φ≤0.1</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr>
<tr><td>0.15<Φ≤0.25</td><td colspan="2">4（distance≧10mm）</td></tr>
<tr><td>0.25<Φ≤0.35</td><td colspan="2">3</td></tr>
<tr><td>Φ>0.4</td><td colspan="2">1</td><td></td></tr>
</table>
</td></tr>
<tr><td>CTP Cover scratch</td><td>
<table>
<tr><td rowspan="2">Width(mm)</td><td rowspan="2">Ignore(mm)</td><td colspan="3">Acceptable Qty</td></tr>
<tr><td>A</td><td>B</td><td>C</td></tr>
<tr><td>Φ≤0.05</td><td>Ignore</td><td colspan="3">Ignore</td></tr>
<tr><td>0.05<W≤0.06</td><td>L≤4.0</td><td colspan="3">N≤3</td></tr>
<tr><td>0.07<W≤0.08</td><td>L≤3.0</td><td colspan="3">N≤2</td></tr>
<tr><td>0.08<W</td><td colspan="4">Define as spot defect</td></tr>
</table>
</td></tr>
</table>

		CTP Cover Pinhole/ Lack of ink	<table><tr><td>Zone / Size (mm)</td><td>Acceptable Qty</td></tr><tr><td></td><td>C</td></tr><tr><td>Φ≤0.2</td><td>Ignore</td></tr><tr><td>0.2<Φ≤0.3</td><td>4(distance≧10mm)</td></tr><tr><td>0.3<Φ≤0.4</td><td>3</td></tr><tr><td>Φ>0.4</td><td>0</td></tr></table>
		CTP Bonding bubble/ accidented spot	<table><tr><td rowspan="2">Size Φ(mm)</td><td colspan="2">Acceptable Qty</td></tr><tr><td>A</td><td>B</td></tr><tr><td>Φ≤0.1</td><td colspan="2">Ignore</td></tr><tr><td>0.15<Φ≤0.2</td><td colspan="2">3(distance≧10mm)</td></tr><tr><td>0.2<Φ≤0.25</td><td colspan="2">2</td></tr><tr><td>Φ>0.25</td><td colspan="2">0</td></tr></table>
		Assembly deflection	beyond the edge of backlight ≤0.2mm
		TP cover broken X：length Y：width Z：height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤0.5mm</td><td>Y≤0.5mm</td><td>Z<cover thickness</td></tr></table> Circuitry broken is not allowed.
		TP cover broken X：length Y：width Z：height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤0.3mm</td><td>Y≤0.3mm</td><td>Z<LCD thickness</td></tr></table> * Circuitry broken is not allowed.

Criteria (functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	TP no function	Not allowed

9. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	70℃,96H	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Non-display; 3.Missing segments/line; 4.Glass crack; 5.Current IDD is twice higher than initial value.
Low Temperature Operating	-20℃, 96HR	
High Temperature Storage	80℃, 96HR	
Low Temperature Storage	-30℃, 96HR	
High Temperature & High Humidity Storage	+60℃, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-30℃,30 min ↔ 80℃,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±8KV, 5times; Contact:±6KV, 5 times; (Environment: 15℃~35℃, 30%~60%).	
Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	
Box Drop Test	1 Corner 3 Edges 6 faces,80㎝(MEDIUM BOX)	

Remark:

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

2.Sample size 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 judged as a good part.

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

10. Cautions and Handling Precautions

10.1 Handling and Operating the Module

(1) When the module is assembled, it should be attached to the system firmly.
Do not warp or twist the module during assembly work.
(2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
(3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.
(4) Do not allow drops of water or chemicals to remain on the display surface.
If you have the droplets for a long time, staining and discoloration may occur.
(5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
(6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.
Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
(7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.
(8) Protect the module from static; it may cause damage to the CMOS ICs.
(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
(10) Do not disassemble the module.
(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
(12) Pins of I/F connector shall not be touched directly with bare hands.
(13) Do not connect, disconnect the module in the “Power ON” condition.
(14) Power supply should always be turned on/off by the item 6.1 Power On Sequence &6.2 Power Off Sequence

10.2 Storage and Transportation.

(1) Do not leave the panel in high temperature, and high humidity for a long time.
It is highly recommended to store the module with temperature from 0 to 35 ℃ and relative humidity of less than 70%
(2) Do not store the TFT-LCD module in direct sunlight.
(3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.
(4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.
In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.
(5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.

11. Packing

----TBD----------