SPECIFICATION

Product Model: PV07067Y0115U-CT

Designed	Checked	Approved
研發部 2022.8.25 Sam	研發部 2022.8.25 Ryan	研發部 2022.8.25 Ben

Approval by Customer:

Customer name:
Customer model:
Approved By _____

Revision Record

Rev NO.	Rev Date	Contents	Note
V0	2022.8.25	New Issue	

Table of Contents

1. Scope

This specification defines general provisions as well as inspection standards for TFT LCD module & Touch Screen supplied by Kingtech Group Co.,Ltd
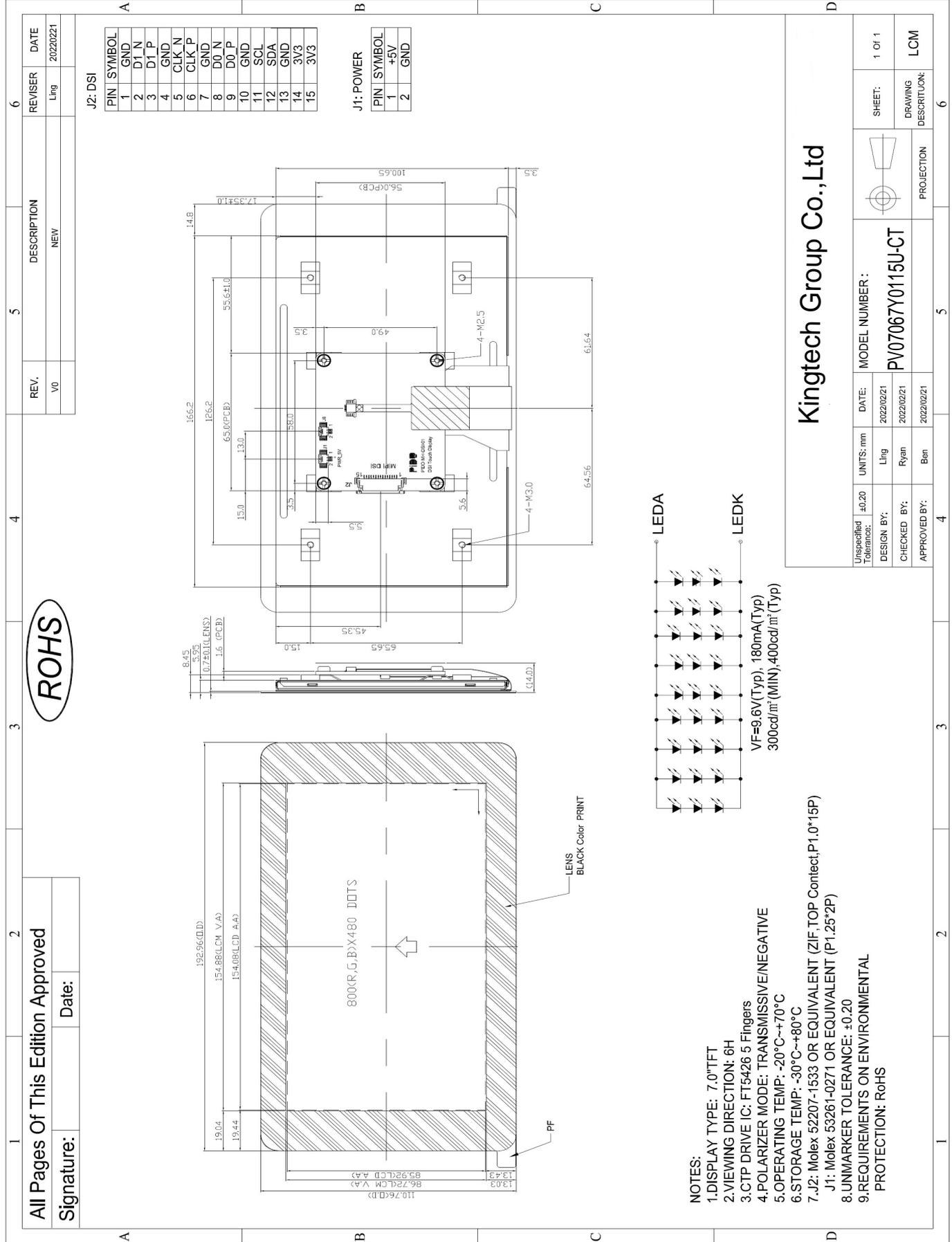
2. General Information

2.1 LCM

Item	Standard Values	Unit
LCD type	7.0" TFT	
Dot arrangement	800×R.G.B.×480	dots
Color filter array	RGB vertical stripe	
Display mode	Normally White	
Convertor IC	ICN6211	
Module size	192.96(W)×110.76(H)×8.45(T)	mm
Active area	154.08(W)×85.92(H)	mm
Interface	DSI MIPI-2 Lane	
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Weight	TBD	g

2.2 CTP

Item	Standard Values	Unit
Touch Panel Size	7.0"	
Touch type	Projective capacitive touch panel	
Input Method	Finger / 5 Points touch	
Output Interface	I2C	
Hardness	≧6H	
IC	FT5426	
I2C Address (7 Bits)	0x38	
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C

3. External Dimensions

J2: DSI

PIN	SYMBOL
1	GND
2	D1_N
3	D1_P
4	GND
5	CLK_N
6	CLK_P
7	GND
8	D0_N
9	D0_P
10	GND
11	SCL
12	SDA
13	GND
14	3V3
15	3V3

J1: POWER

PIN	SYMBOL
1	+5V
2	GND

LEDA
LEDK

VF=9.6V(Typ), 180mA(Typ)
300cd/m²(MIN),400cd/m²(Typ)

LENS
BLACK Color PRINT

800(R,G,B)X480 DOTS

NOTES:
1.DISPLAY TYPE: 7.0"TFT
2.VIEWING DIRECTION: 6H
3.CTP DRIVE IC: FT5426 5 Fingers
4.POLARIZER MODE: TRANSMISSIVE/NEGATIVE
5.OPERATING TEMP: -20°C~+70°C
6.STORAGE TEMP: -30°C~+80°C
7.J2: Molex 52207-1533 OR EQUIVALENT (ZIF,TOP Contect,P1.0*15P)
  J1: Molex 53261-0271 OR EQUIVALENT (P1.25*2P)
8.UNMARKER TOLERANCE: ±0.20
9.REQUIREMENTS ON ENVIRONMENTAL PROTECTION: RoHS

Kingtech Group Co.,Ltd

MODEL NUMBER: PV07067Y0115U-CT

		UNITS: mm	DATE:	2022/02/21
Unspecified Tolerance:	±0.20	DESIGN BY:	Ling	2022/02/21
		CHECKED BY:	Ryan	2022/02/21
		APPROVED BY:	Ben	2022/02/21

SHEET: 1 Of 1
DRAWING DESCRITUON: LCM
PROJECTION

All Pages Of This Edition Approved
Signature: Date:

ROHS

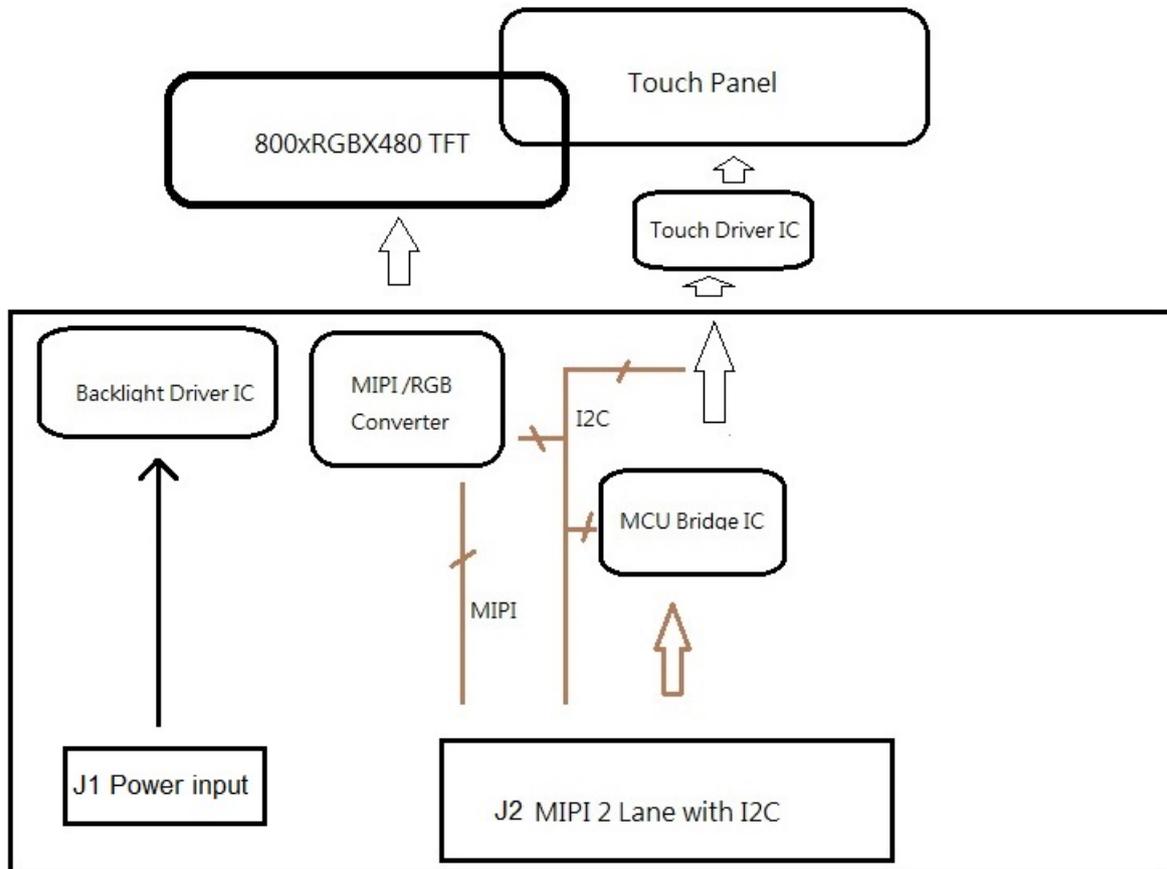| REV.	DESCRIPTION	REVISER	DATE
V0	NEW	Ling	20220221

4. Module Structure
4.1 Block Diagram

4.2 Interface Description
J2: Connector: Molex 52207-1533 or Equivalent ZIF P1.0 15P

Pin	Pin Name	Description	Remark
1	GND	Ground	
2	D1_N	- MIPI Differential Data1 Input	
3	D1_P	+ MIPI Differential Data1 Input	
4	GND	Ground	
5	CLK_N	- MIPI Differential Clock Input	
6	CLK_P	+ MIPI Differential Clock Input	
7	GND	Ground	
8	D0_N	- MIPI Differential Data0 Input	
9	D0_P	+ MIPI Differential Data0 Input	
10	GND	Ground	
11	SCL	I2C Clock Input	
12	SDA	I2C Data Input	
13	GND	Ground	
14	3V3	Power supply: + 3.3V	
15	3V3	Power supply: + 3.3V	

J1: Connector: Molex 53261-0271 or Equivalent ZIF P1.5 2P

Pin	Pin Name	Description	Remark
1	+5V	Power supply	
2	GND	Ground	

5. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Remark
Supply Voltage	3V3	-0.3	3.66	V	
Supply Voltage	+5V	-0.3	6.0	V	

6. DC Characteristics
6.1 LCM Parameters

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Voltage	3V3	3.0	3.3	3.6	V	
Power Voltage	+5V	4.5	5.0	5.5	V	
Input logic high voltage	V_{IH}	0.7*3V3	-	3V3	V	
Input logic low voltage	V_{IL}	GND	-	0.3*3V3	V	
Output High Voltage	V_{OH}	3V3-0.4	-	3V3	V	
Output Low Voltage	V_{OL}	GND	-	GND+0.4	V	
Current for Power	I_{V3V}	-	100	150	mA	3V3=3.3V
Current for Power	I_{+5V}	-	500	650	mA	+5V=5.0V

6.2 CTP Parameters

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Input logic high voltage	V_{IH}	0.7* 3V3	-	3V3	V	
Input logic low voltage	V_{IL}	-0.3	-	0.3* 3V3	V	
Output High Voltage	V_{OH}	0.7* 3V3	-	V3V	V	
Output Low Voltage	V_{OL}	GND	-	0.3* 3V3	V	

7. Timing Characteristics
7.1 MIPI DSI characteristics
7.1.1 Recommended Operation Condition

Parameter	Description	Min	Typ	Max	Unit
V_{DD}	VDD1 & VDD2 & VDD3 power supply	1.65		3.66	V
V_{PSN}	Supply noise on any VCC pin	f(noise)> 1MHz		0.05	V
T_A	Operating free-air temperature	-40		85	℃
T_{CASE}	Case temperature			92.2	℃
V_{DSI_PIN}	DSI input pin voltage range	-50		1350	mV
$f_{(I2C)}$	Local I2C input frequency			400	KHz
f_{HS_CLK}	DSI HS clock input frequency	40		500	MHz
t_{setup}	DSI HS data to clock setup time	0.15			UI
t_{hold}	DSI HS data to clock hold time	0.15			UI
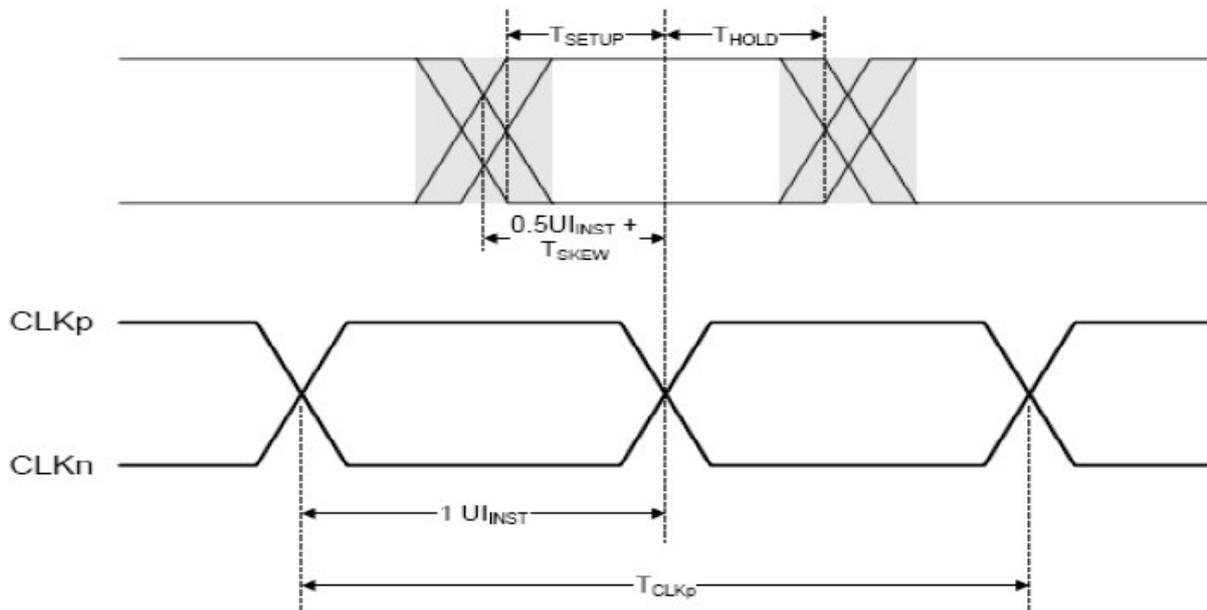
Figure 7-1 DSI HS UI timing definition

7.1.2 MIPI DSI Interface

Parameter	Description	Min	Typ	Max	Unit
V_{IL}	Low power logic 1 input voltage	880			mV
V_{IH}	Low power logic 0 input voltage			550	mV
$|V_{ID}|$	Hs differential input voltage: $|V_{dp} - V_{dn}|$	70	200	270	mV
$|VIDT|$	HS differential input voltage threshold			50	mV
$V_{IL-ULPS}$	Low power receiver logic 0 voltage, ULP state			300	mV
$V_{CMRX(DC)}$	Common-mode voltage HS receive mode	70		330	mV
$\triangle V_{CMRX(HF)}$	HS common-mode interference			100	mV
V_{IHHS}	HS single-ended input high voltage			460	mV
V_{ILHS}	HS single-ended input low voltage	-40			mV
$V_{TERM-RN}$	Single-ended threshold for HS termination enable			450	mV
V_{ID}	Differential input impedance	80	100	124	Ω

Figure 7-2 DSI HS/LP signaling and Contention Voltage

7.1.3 Switching characteristics

Parameter	Description	Min	Typ	Max	Unit
DSI					
t_{GS}	DSI LP input pulse rejection			300	ps
RGB output					
FCLK	Output pixel clock	2		154	MHz
TCKH	Pixel clock HIGH period	40	50	60	%
TCKL	Pixel clock LOW period	40	50	60	%
TDLY	Data and sync signals related to PCLK	0		800	ps
REFCLK					
F_{REFCLK}	REFCLK frequency	10		154	MHz
tr, tf	REFCLK rise and fall time	0.1		1	ns
tpj	REFCLK peak-to-peak phase jitter			50	ps
Duty	REFCLK duty cycle	40	50	60	%
EN, ULPS, RESET					
ten	Enable time from EN or ULPS			1	ms
tdis	Disable time to standby			0.1	ms
treset	Reset time	10			ms
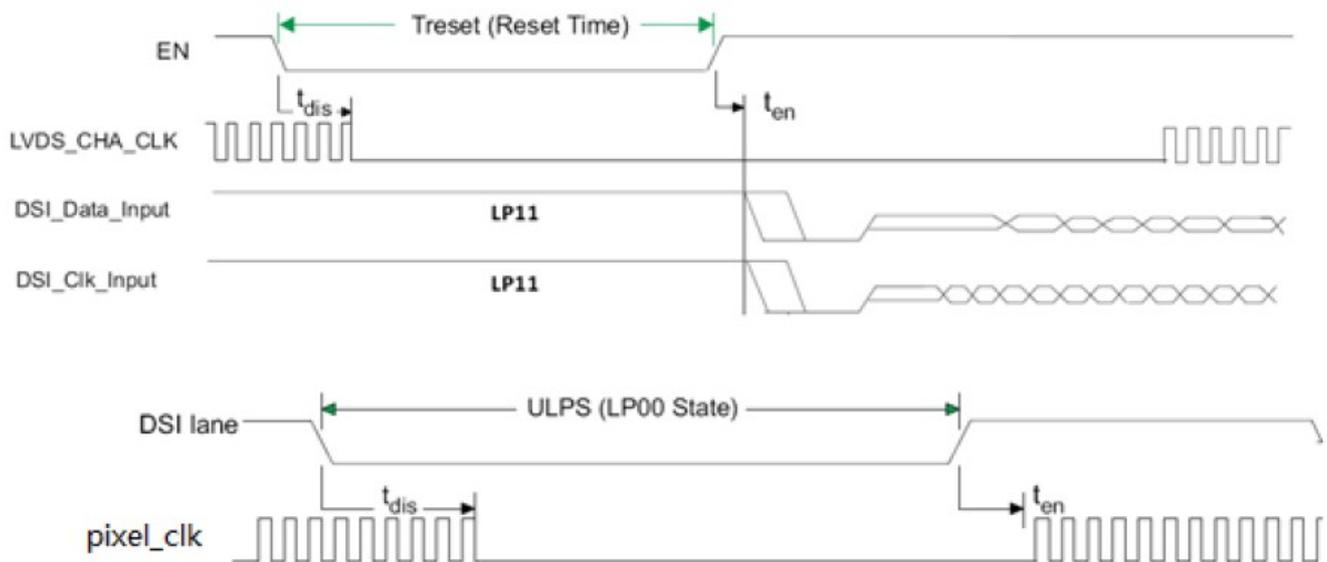
Figure 7-4 Power on and RESET and ULPS timing

7.2   I2C Access Local registers

Support Raspberry Pi 7-inch touchscreen driver
Reference " panel-raspberrypi-touchscreen.c"

The 5" touchscreen consists of a DPI LCD panel, a CHIPONE ICN6211
DSI-DPI bridge, and an I2C-connected Atmel ATTINY88-MUR controlling power
management, the LCD PWM, and initial register setup of the ICN6211.

This driver controls the ICN6211 and ATTINY88, presenting a DSI device with a drm_panel.

7.3 Timing Table

Item	Symbol	Values			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd	-	800	-	DCLK
DCLK Frequency	fclk	26.4	33.3	46.8	MHz
One Horizontal Line	th	862	1056	1200	DCLK
HS pulse width	thpw	1	-	40	DCLK
HS Blanking	thb	46	46	46	DCLK
HS Front Porch	thfp	16	210	354	DCLK

Item	Symbol	Values			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd	-	480	-	TH
VS period time	tv	510	525	650	TH
VS pulse width	tvpw	1	-	20	TH
VS Blanking	tvb	23	23	23	TH
VS Front Porch	tvfp	7	22	147	TH

8. Backlight Characteristic

Item	Symbol	Min	Typ	Max	Unit	Remark
Luminous Intensity for LCM and TP	-	300	400	-	cd/m2	
Luminance uniformity	-	80	-	-	％	
Life Time	-	30000	-	-	Hr	
Color	White					

9. Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Remark
Viewing Angle (CR>10)	Horizontal	θL	60	70	-	degree	Note 1
		θR	60	70	-		
	Vertical	θT	40	50	-		
		θB	60	70	-		
Contrast Ratio	Center		400	500	-	-	Note 2
Response Time	Rising		-	10	20	ms	Note 3
	Falling			15	30	ms	
CF Color Chromaticity (CIE1931)	Red x		0.53	0.58	0.63	-	Note 4
	Red y		0.30	0.35	0.40	-	
	Green x		0.30	0.35	0.40	-	
	Green y		0.55	0.60	0.65	-	
	Blue x		0.10	0.15	0.20	-	
	Blue y		0.03	0.08	0.13	-	
	White x		0.26	0.31	0.36	-	
	White y		0.28	0.33	0.38	-	

Note:
1. Definition of Viewing Angle:
   Viewing angles are measured by BM5A
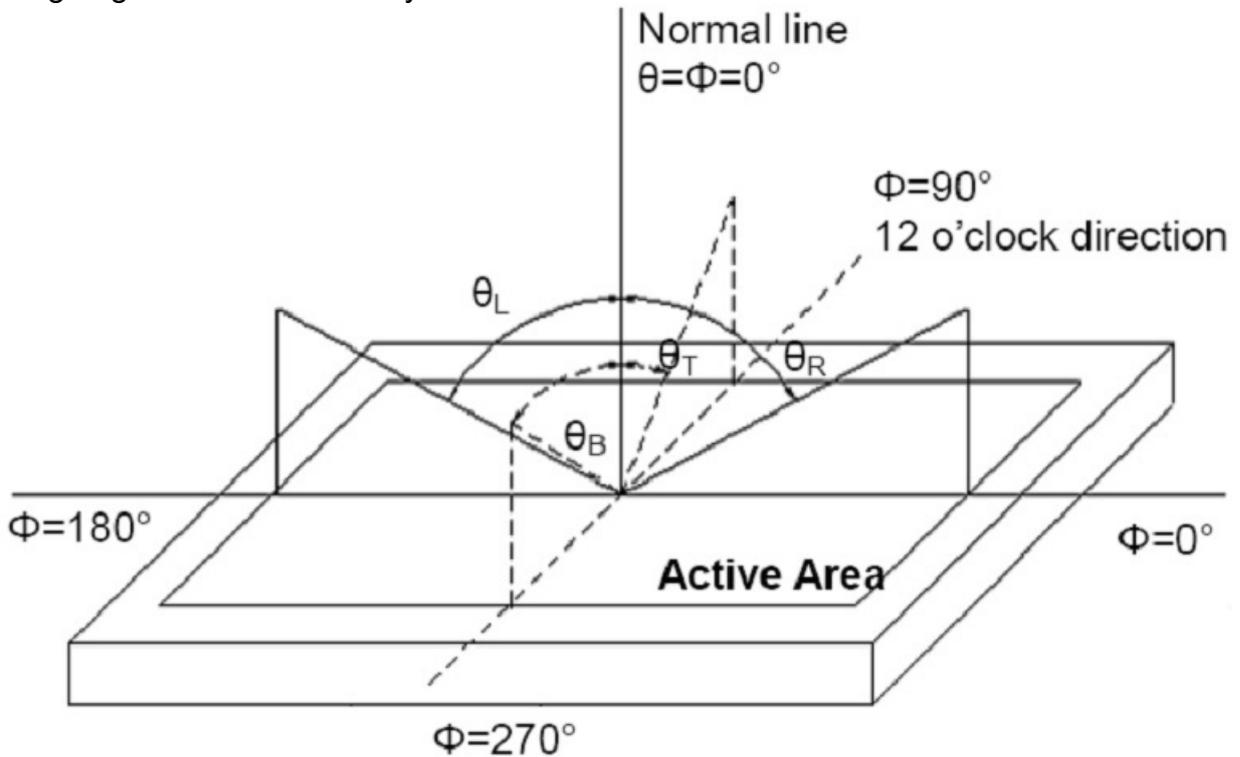
2. Definition of Contrast Ratio (CR):
   The contrast ratio can be calculated by the following expression.
   Contrast Ratio (CR) = L255 / L0
   L255: Luminance of gray level 255
   L 0: Luminance of gray level
   CR = CR (5), where CR (X) is corresponding to the Contrast Ratio of the point X at the figure in

3. Definition of Response Time (TR, TF):
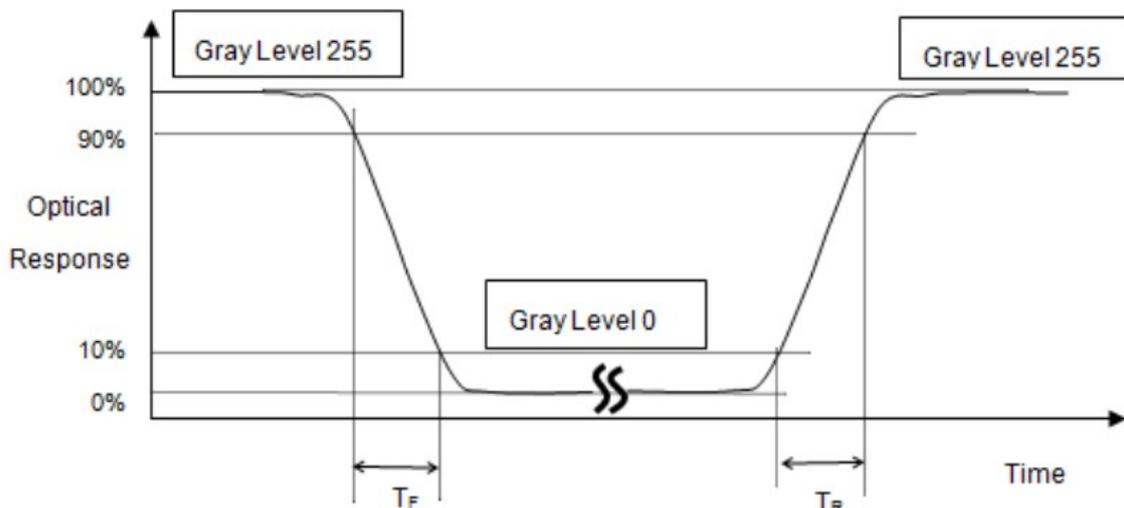
4. Measurement Setup:

The LCD assembly should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a windless room.
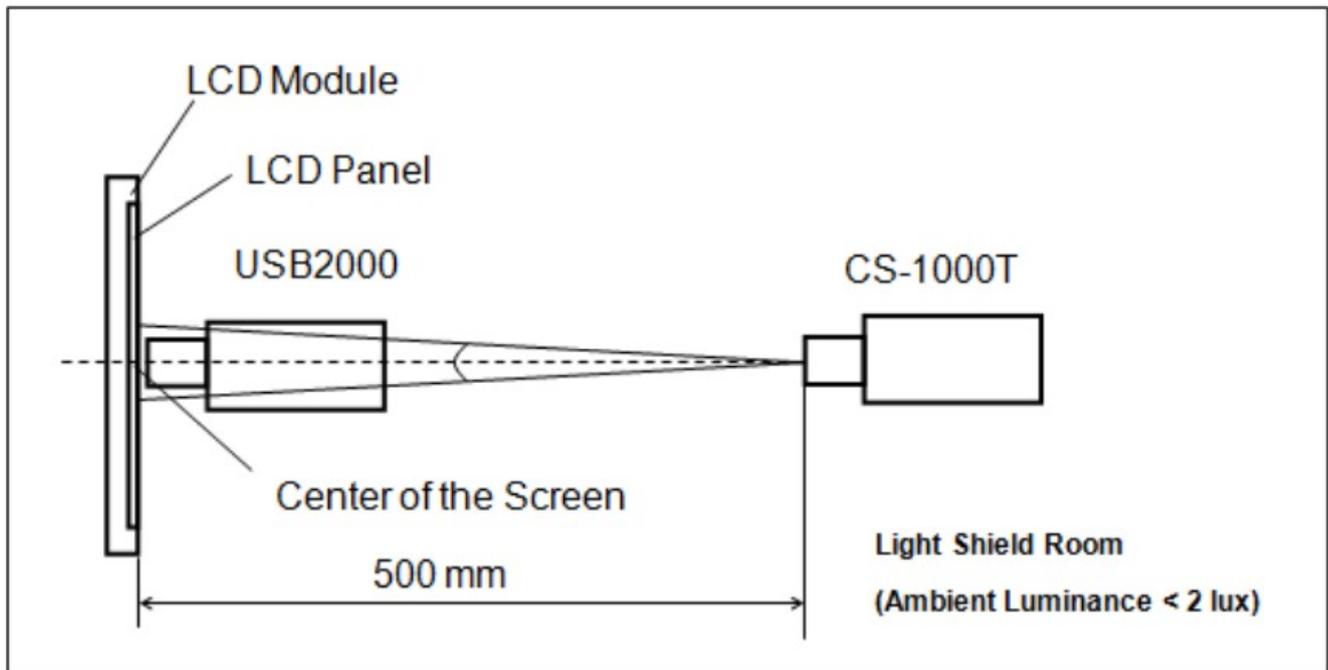
10. Reliability Test Conditions and Methods

NO.	Test Items	Test Condition
①	High Temperature Storage	Keep in 80°C±2°C×240Hrs Surrounding temperature, then storage at normal condition 4hrs.
②	Low Temperature Storage	Keep in -30°C±2°C×240Hrs Surrounding temperature, then storage at normal condition 4hrs.
③	High Temperature Operating	70°C±2°C×240Hours
④	Low Temperature Operating	-20°C±2°C×240Hours
⑤	High Temperature / High Humidity Storage Test	Keep in 60°C±5°C×90%RH×240Hrs Surrounding temperature, then storage at normal condition 4hrs.
⑥	Temperature Cycling Storage Test	-30°C → +25°C → 80°C → +25°C (30mins)　(5mins)　(30mins)　(5mins) ◄─────── 30 Cycle ───────► Surrounding temperature, then storage at normal condition 4hrs.
⑦	ESD Test	Air Discharge: Apply 8 KV with 5 times Discharge for each polarity +/-　　Contact Discharge: Apply 250 V with 5 times discharge for each polarity +/- 1. Temperature ambiance : 15°C～35°C 2. Humidity relative : 30%～60% 3. Energy Storage Capacitance (Cs + Cd): 150pF±10% 4. Discharge Resistance (Rd): 330Ω±10% 5. Discharge, mode of operation: Single Discharge (time between successive discharges at least 1 sec)　　(Tolerance if the output voltage indication : ±5%)
⑧	Vibration Test (Packaged)	1. Sine wave 10 ~ 55 Hz frequency (1 min/sweep) 2. The amplitude of vibration :1.5 mm 3. Each direction (X、Y、Z) duration for 2 Hrs
⑨	Drop Test (Packaged)	<table><tr><td>Packing Weight (Kg)</td><td>Drop Height (cm)</td></tr><tr><td>0 ~ 45</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table> Drop Direction: ※1 corner / 3 edges / 6 sides each 1time

11. Inspection Standard

11.1. Quality:

The quality of goods supplied to purchaser shall come up to the following standard.

11.1.1. The method of preserving goods.

After delivery of goods from Kingtech to purchaser. Purchaser shall control the LCM AT -10 TO 40, and it might be desirable to keep at the normal room temperature and humidity until incoming inspection or throwing into process line.

11.1.2. Incoming inspection

(A) The method of inspection.

If purchaser make an incoming inspection, a sampling plan shall be applied on the condition that quality of one delivery shall be regarded as one lot.

(B) The standard of quality.

ISO-2859-1 (SAME AS MIL-STD-105E), LEVEL: II

Class	AQL (%)
Critical	0.4 %
Major	0.65 %
Minor	1.5 %

Every item shall be inspected according to the class.

(C) Measure

If as the result of above receiving inspection, a lot out is discovered. Purchaser shall be informed seller of it within seven days. But first shipment within fourteen days.

11.1.3. Warranty policy

Kingtech will provide one-year warranty for the products only if under specification operating conditions.   Kingtech will replace new products for these defect products which under warranty period and belong to the responsibility of Kingtech

11.2. Checking condition:

11.2.1. Checking direction shall be in the 45 degree area to face the sample.

11.2.2. Checker shall see over 300±25 mm. With bare eyes far from sample.

11.3.3. Inspection Plan:

Class	Item	Judgement	Class
Packing & Indicate	1. Outside and inside package	"Model On.", "Lot No." and "Quantity" Should indicate on the package.	Minor
	2. Model mixed and quantity	Other model mixed…….rejected Quantity short or over……..rejected	Critical
	3. Product indication	"Model On." Should indicate on the product	Major
Assembly	4. Dimension, LCD glass scratch and scribe defect.	According to specification or drawing.	Major
Appearance	5. Viewing area	Polarizer edge or LCD's sealing line is visible in the viewing area……..rejected	Minor
	6. Blemish, Black spot, White spot in the LCD and LCD glass cracks	According to standard of visual inspection(inside viewing area)	Minor
	7. Blemish, Black spot, White spot and scratch on the polarizer	According to standard of visual inspection (inside viewing area)	Minor
	8. Bubble in polarizer	According to standard of visual inspection (inside viewing area)	Minor
	9. LCD's rainbow color	Strong deviation color (or newton ring) of LCD……..rejected. Or according to limited sample (if needed, and inside viewing area)	Minor
Electrical	10. Electrical and optical characteristics (contrast, VOP, chromaticity…ETC)	According to specification or drawing. (Inside viewing area)	Critical
	11. Missing line	Missing dot, line, character……..rejected	Critical
	12. Short circuit wrong pattern display	No display, Wrong pattern display, Current consumption out of specification……..rejected	Critical
	13. Dot defect (for color and TFT)	According to standard or visual inspection	Minor

11.4. Standard of visual inspection

No	Class	Item	Judgement
11.4.1	Minor	Black and white spot foreign materiel dust in the cell blemish scratch.	(A) Round type: unit: mm **Round type table** Diameter (mm) — Acceptable Q'ty $\varnothing \leqq 0.1$ — Disregard $0.1 < \varnothing \leqq 0.25$ — 3(Distance > 5mm) $0.25 < \varnothing$ — 0 Note: $\varnothing$=(Length + Width)/2 (B) Linear type: unit: mm Length — Width — Acceptable Q'ty - — $W \leqq 0.03$ — Disregard $L \leqq 5.0$ — $0.03 < W \leqq 0.07$ — 3(Distance > 5mm) - — $0.07 < W$ — Follow round type
11.4.2	Minor	Bubble in polarizer dent on polarizer.	unit: mm Diameter (mm) — Acceptable Q'ty $\varnothing \leqq 0.2$ — Disregard $0.2 < \varnothing \leqq 0.5$ — 2(Distance > 5mm) $0.5 < \varnothing$ — 0
11.4.3	Minor	Dot Defect	Items — ACC. Q'TY Bright dot — $N \leqq 4$ Dark dot — $N \leqq 4$ Pixel Define: Note 1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot. Note 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern. Note 3: Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue pattern.
11.4.4	Minor	LCD glass chipping	Y > S

11.4.5	Minor	LCD glass chipping		X or Y > S
11.4.6	Minor	LCD glass Glass crack		$Y > (1/2)\,T$
11.4.7	Minor	LCD glass Scribe defect		1. a > L/3, A > 1.5mm 2. B: According to dimension
11.4.8	Minor	LCD glass Chipping (on the terminal area)		$\Phi=(X+Y)/2 > 2.5mm$
11.4.9	Minor	LCD glass Chipping (on the terminal surface)		$Y > (1/3)T$
11.4.10	Minor	LCD glass chipping		$Y > T$ If touch the electrode lines, the need to retain the two-thirds electrode lines.

12. Handling Precautions

12.1 Mounting method

The LCD panel 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.

12.2 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 (CI), 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 happens by miss-handling or using some materials such as Chlorine (CI), Sulfur (S) from customer, Responsibility is on customer.

12.3 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.

12.4 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

12.5 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.

12.6 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.

12.7 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.

13. Precaution for Use

13.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

13.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification.
- When a new problem is arisen which is not specified in these specifications.
- When inspection specifications change or operating condition change in customer is reported to Kingtech, and some problem is arisen in this specification due to the change.
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

14. Packing Method

TBD